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AUGUST 1957

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Volume 37 **Number 8**

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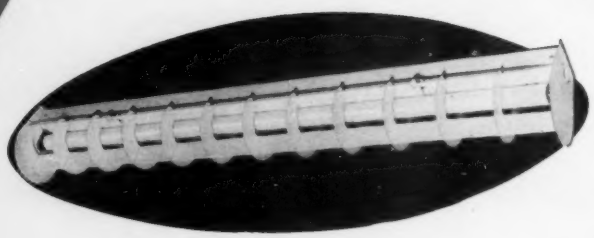

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Economic comment

by J. Whitney Bunting, Ph.D.

Contributing Economics Editor

Easier credit and housing

For some time past, now, there has been a decided belief that all the impetus needed for an increase in home construction was easier credit terms for prospective buyers. Lobbyists in Washington have pushed hard for a review of the government's position that tightened the prospects of borrowing for home purchases or construction. In fact, the pressure has been so great that there is still some hope for congressional action in this respect, although such hope is dwindling for this session at least.

There is little doubt but that the difficulty in obtaining favorable borrowing terms is a factor in the "housing recession" for the current American scene considers the mortgage as a conventional domestic fixture. Few buyers, either of high-value or low-value homes, pay cash for a new home today. Yet there are other limiting factors that have entered the picture that deserve mention too.

The ability to get satisfactory labor for construction purposes, of any type, is limited in many localities. This is particularly true in regions where there is a current boom in business and industrial construction. For example, if a city is in the throes of business expansion beyond the capacity of existing structures, then it is a vital necessity to build those structures that will maintain the expansion pace. Since labor supply on the open market is a limited commodity, home builders must compete with business construction firms for the limited supply of manpower available.

There is the further problem of full employment of most able-bodied men in industry thus curtailing the supply of workers for construction projects. The shortage of manpower, and the competition for what there is, has raised the cost of new construction rapidly. This is particularly true in Southern communities where available labor supplies are being drawn into industrial work.

In addition to increased labor costs, builders are now plagued by high-cost building materials usually in short supply. Although housing is not as dependent upon structural steel as is business construction, nevertheless there is a lack of steel for the varied needs of the home builder. This is in spite of the heavy production schedule of the major steel mills. Lumber, cement, and other construction necessities are in the same condition and force the price of even a standard house way out of the line of reason.

As a result, the housing drop is not caused completely by governmental credit restrictions. The inflationary aspects of material and labor costs must be figured in as essential restrictive forces. Until the latter forces are minimized in their impact upon the economy, it might well be dangerous economically to take credit restrictions off of the housing field.

Production trends

It is no secret now that industrial production has slipped somewhat from 1956 levels. This has been a gradual trend that has been almost unnoticeable to all except the industrial statistician. Moreover, the trend has been affecting almost all industries and not just a few. The result has not been felt in any serious fashion, economically speaking, but it is possible that a continued downsurge might cause some very serious problems.

Just how much of this production slow-down is caused by planned inventory reduction is difficult to say. Some months ago it appeared certain that inventories of many industrial products might rise beyond safe levels. More recently, however, these stockpiles have been declining within more normal limits and the fears of six months ago no longer persist. If this factor has been the cause of the industrial slow-down, then the latter part of the year should see a resurgence of industrial activity.

At the same time that industrial production has been reduced, however, many companies have been increasing their capacity to produce by modernizing machinery and methods, by relocating existing facilities, by constructing new and more modern plants, or by some other well-planned technique. The continued interest shown by industry in making more and better production facilities available is a sound indicator of business confidence in the market and in the future. Without such a belief in the strength of the economy, a sharp curtailment of planned production expansion could be anticipated. This very fact is most encouraging.

Dr. Bunting is a well-known economist and educator having special knowledge of the South.

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Tomic Sales and Engineering Co., 4864 Woodward Ave., Detroit 1, Mich., now have available catalog sheets containing data on the complete line of their connectors, couplings, and cable connectors.

1088—Fittings and Fixtures
A 32-page illustrated catalog covering Killark fittings and fixtures is offered by Killark Electric Mfg Co., Vandeventer and Easton Aves., St. Louis 13, Mo.

1092—Electrical Boxes
Steel City Electric Co., 1207 Columbus Ave., Pittsburgh 12, Pa., offers a catalog of their complete line.

1130—Conduit Fittings
The latest completely illustrative catalog on their diversified line of conduit fittings is announced by the Atlantic Conduit Fittings Co., 450 Western Ave., Boston 35, Mass.

1136—Space Heating Guide
Cavalier Corp., Chattanooga 2, Tenn., has prepared a Guide for Calculations on Electric Space Heating. It is based on study of several thousand installations of electric heat and is a handy reference for calculating electric heating requirements and estimating operating costs. The booklet contains discussion, charts, and floor plan examples.

1150—Fluorescent Fixtures
A ninety-six page catalog, "Engineered Lighting," is being offered by Wm. Penn, 1429 South 23rd St., Philadelphia 46, Pa. Specifications and applications are described for interior illumination from 10 to 750 foot candle levels.

1166—Electrical Fittings
A 40-page illustrated catalog and price list on the Gedney line. Shown and listed are conduit, threaded entrance, SEC, EMT and ground fittings, and box connectors for both armored and non-metallic cables. Copies are available from Gedney Electric Co., RKO Bldg., Radio City, New York 20, N. Y.

1184—Approved RHW Wire
Bulletin No. 1018 describing first Underwriters' Approved Type RHW Wire, developed to meet the new National Electrical Code standards, is available from Simplex Wire and Cable Co., 79 Sidney St., Cambridge 39, Mass.

1190—Electrical Fittings
Blackhawk Industries, Dubuque, Iowa, offers a complete catalog of electrical conduit and cable fittings. Also a special publication giving detail drawings and instructions for installing service entrance masts on low or ranch type buildings.

1192—Wire Pulling Lubricant
Illustrated six-page folder showing the advantages of an improved Y-Er Eas wire pulling lubricant is available from Electro Compound Co., 3812 150th St., Cleveland 11, Ohio.

1214—General Catalog
General catalog of Royal Electric Corporation, Pawtucket, R. I. covering flexible, service and lamp cords, cord sets, extensions, trouble lights, wiring devices and fuses is available to wholesalers. Dealer catalogs may be secured from Royal distributors.

1218—Carbon Products
A 28-page catalog on Motor and Generator Brushes and carbon products telling how to order brushes, grade recommendations, characteristics, and description of brush grades, is available from the Helwig Co., 2536 North 30th St., Milwaukee, Wis.

1220—Stadium Lighting
The Pyle-National Co., 1334 N. Kostner Ave., Chicago, Ill., announces the availability of a new eight-page bulletin, No. 605, on stadium lighting, describing in detail floodlighting of a typical outdoor athletic arena stressing the importance of using fully enclosed floodlights.

1224—Electrical Equipment
The Wadsworth Electric Mfg. Co., Inc., Covington, Ky., has issued a new catalog Con 15-0 and Bulletin W. C. B. 53-1, containing data on their lines of Safety Switches, Service Equipment, Distribution Panels and "E-Z-RED" Circuit Breakers.

1230—Compression Connectors
An illustrated 18-page bulletin (13A) describes Squeezon compression connectors for all overhead distribution connections from line wire to ground rod. Offered by James R. Kearney Corp., 4236 Clayton Ave., St. Louis 10, Mo., the bulletin also describes the mechanical and hydraulic installation tools required and tells where to use each.

ELECTRICAL SOUTH
806 Peachtree St., NE
Atlanta 8, Ga.

August, 1957

Gentlemen:

Please send me the bulletins and catalogs indicated.
(Print Plainly)

name ..... Title .....

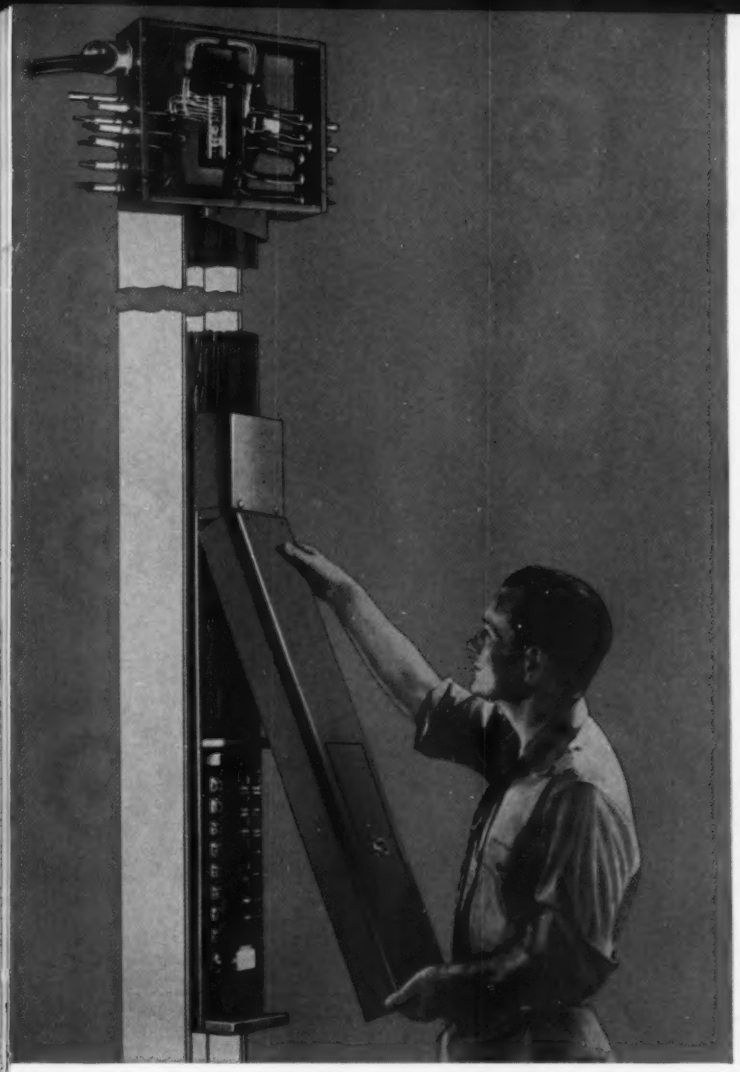
Company .....

Address .....

City & State .....

Circle numbers below. Bulletins and catalogs will be mailed promptly.

1086	1088	1092	1130	1136
1150	1166	1184	1190	1192
1214	1218	1220	1224	1230
1238	1240	1244	1248	1250
1254	1262	1266	1268	1280
1282	1284	1288	1298	1300
1302	1304	1306	1308	1310
1312	1314			



Available with 16, 24 or 32 circuits, the "NP" Electri-Center provides double protection with Duo-Guard Pushmatics. The thermal time and solenoid magnetic elements guard circuits two ways—against overloads and against short circuits.

Your BullDog field engineer will be happy to give you complete details on "NP" panels and the many other BullDog products—help your customers plan, expand or modernize existing facilities, get a coordinated distribution system.

Neat way to save space . . . get Pushmatic safety, too!

Here is eye appeal, savings in space and the best protection electrical circuits can have. It's the BullDog "NP" Electri-Center®, featuring famous Duo-Guard Pushmatic® circuit breakers. Only 6¾" wide, these narrow panels have rounded corners . . . slip easily into standard 8" H beams . . . mount on nonstructural surfaces, too. Wireway extensions and pull boxes eliminate naked conduit runs, simplify and speed installations. And, if space is particularly limited, it's easy to gang-mount three or four "NP's" in an area normally needed for one regular panel.

For complete details about "NP" panels and other BullDog products consult your BullDog field engineer. And whenever you plan any electrical expansion, look to BullDog for the new, the different, the better . . . in everything from a safety switch to a complete, flexible distribution system.

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BullDog Electric Products Company, Detroit 32, Michigan. • A Division of I-T-E Circuit Breaker Company • *Export Division:* 13 East 40th St., New York 16, New York. *In Canada:* BullDog Electric Products Company (Canada), Ltd., 80 Clayson Rd., Toronto 15, Ontario.

IF IT'S NEW . . . IF IT'S DIFFERENT . . . IF IT'S BETTER . . . IT'S

BULLDOG

ELECTRIC PRODUCTS COMPANY

A DIVISION OF I-T-E CIRCUIT BREAKER COMPANY

CONSULT THE FOLLOWING SOUTHERN REPRESENTATIVES:

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Houston, Texas

WILSON ELECTRICAL EQUIPMENT CO.
101 E. Maple St.
San Antonio, Texas

STANDARD ELECTRIC MFG. CO.
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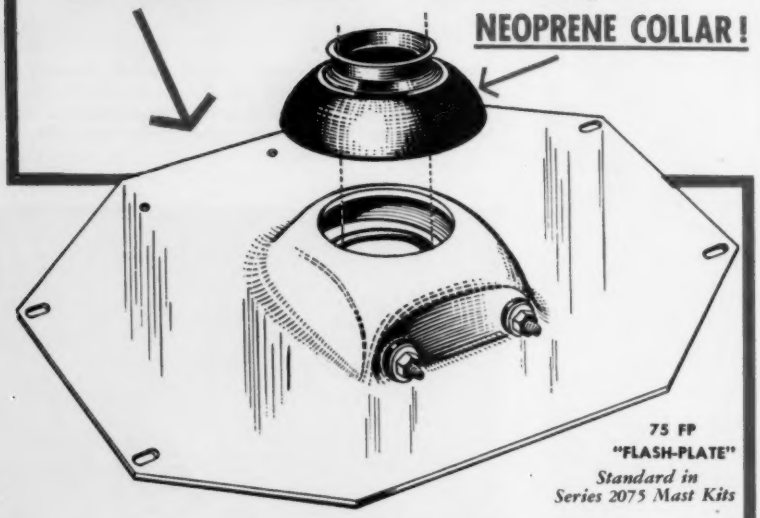
Dallas 1, Texas

WALKER ELECTRICAL CO., INC.
125 Bennett St., N.W., P.O. Box 8, Sta. D
Atlanta, Georgia

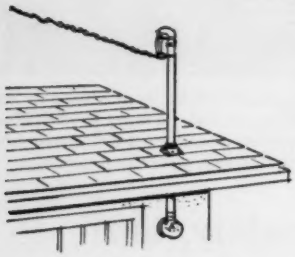
new

from Porcelain Products . . . combination roof-plate and flashing with NEOPRENE COLLAR!



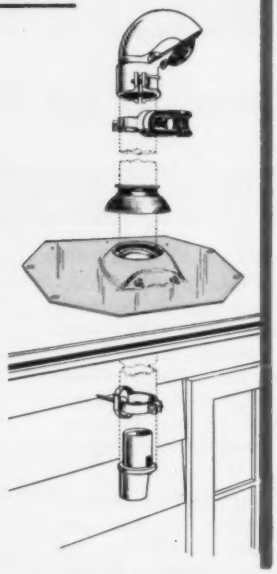
75 FP
"FLASH-PLATE"
Standard in Series 2075 Mast Kits

Makes installation



- **QUICKER—fewer parts**
- **EASIER—no caulking**

at Less Cost!



Now, Porcelain Products Mast Kits feature FLASH-PLATE, a combined roof-plate and flashing, plus a lifetime, watertight Neoprene collar. The "one-piece" feature makes Porcelain Products Mast Kits easier to install . . . provides a stronger, longer lasting, safer entrance mast . . . ALL AT *LESS* COST TO YOU!

Flash-plate is heavy, 14 gauge galvanized plate. It supports a 2" or 2½" mast on any roof, neatly and effectively, *with no caulking* needed. Available through recognized electrical distributors or write for further information.

ELECTRICAL PORCELAIN SINCE 1894

63 years

Porcelain Products, Inc.

PP —INC.—

FINDLAY, OHIO

Enter Code Numbers of Catalogs Desired on Coupon on Page 8

1238—Selecting Fuses

A 12-page descriptive handbook "Fuseology" tells how to get safest most dependable, trouble-free electrical protection from fuses. Contains useful information on selecting right size and type of fuses—how to stop needless blows—avoiding poor contact and other troubles. Issued by Bussmann Mfg. Co., University at Jefferson, St. Louis 7, Mo.

1240—Lighting Fixtures

Prescolite Manufacturing Corp., 2229 Fourth St., Berkeley 10, Calif., now has available a 20 page color catalog, No. 31-F, describing their complete line of lighting fixtures including recessed series and accessories, surface series and accessories, exit light, and aisle lights. A typical installation and dimensional drawing are shown for each fixture.

1244—New Electrical Fittings Catalog

Concise 36-page catalog illustrates and describes a complete line of electrical fittings, cable racks and wiring specialties. The catalog contains many detail drawings, clear-cut photographic illustrations of mast fittings, cable connectors, straps, hangers and ground clamps in a wide variety of types and sizes. For your free copy, write The M. & W. Electric Mfg. Co., East Palestine, Ohio.

1248—Conductor Armor

A new catalog of Superformed Armor Rods, Lineguards, Patch Rods, and Tap Armor describing various uses and applications of these products on overhead conductors is offered by The Fanner Manufacturing Company, Brookside Park, Cleveland 9, Ohio.

1250—Electrical Enclosures

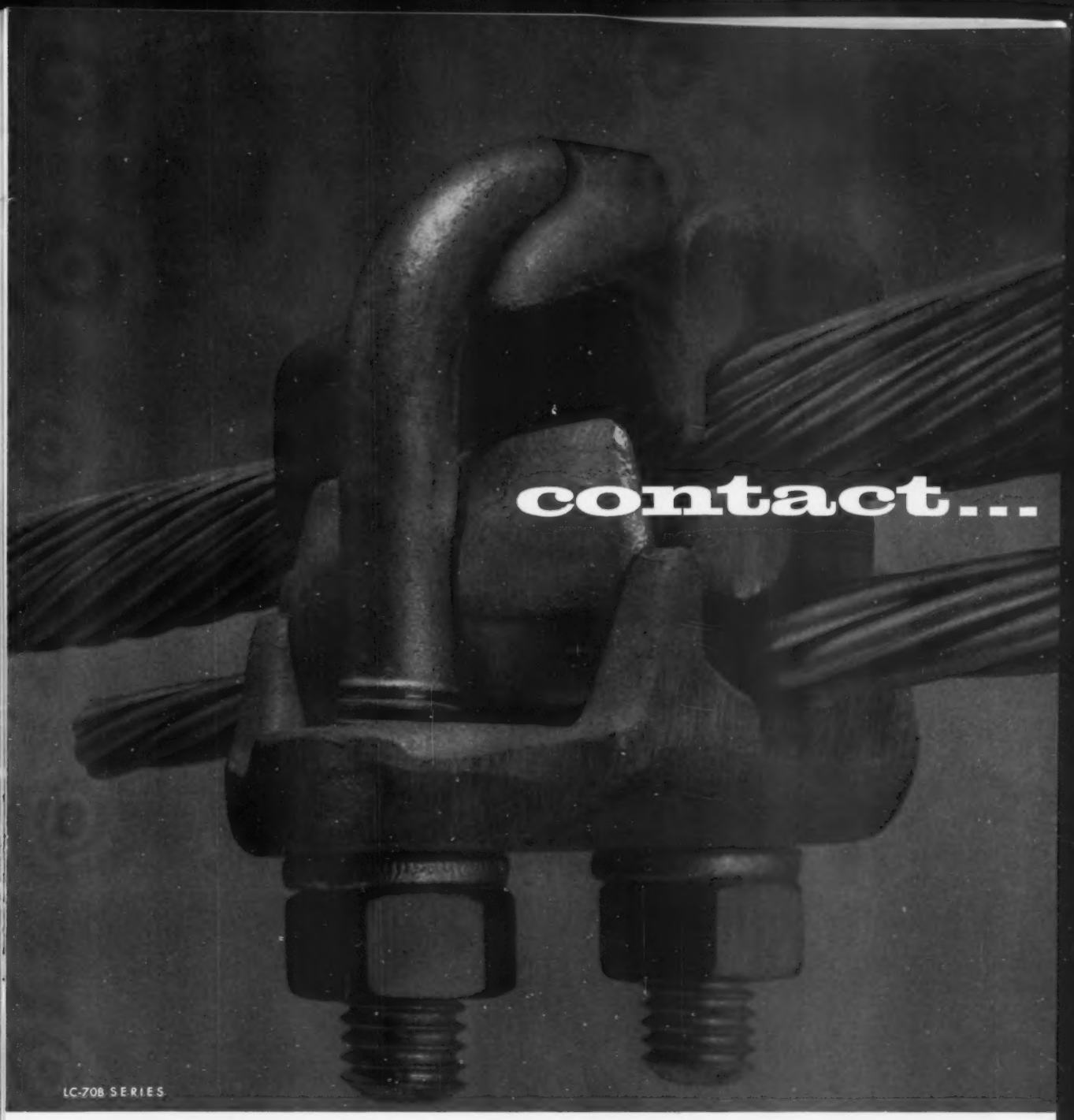
Catalog No. 5354 currently being offered to the trade by B & C Metal Stamping Co., 590 Means St., N. W., Atlanta, Ga., is a well-organized, 66-page manual giving complete descriptive information, prices, and specifications on all items in the B & C line of electrical enclosures. Copies are available free of charge to electrical contractors.

1254—Construction Anchors

"Anchoring for Power and Communication Lines," a completely illustrated manual on improving line construction with better anchoring, has been published by the Advertising Dept., the A. B. Chance Co., Centralia, Mo. The 25-page booklet shows how to install the right anchor at the right place in the right way.

1262—Fluorescent Fixtures

The new loose-leaf catalog recently issued by Southern Lighting Manufacturing Co., 501 Elwell St., Orlando, Fla., contains complete diagrams, specifications, and descriptions for all fluorescent fixtures which they manufacture. In addition to the information on commercial, industrial and school fixtures, the catalog also lists hangers, troffers, troffer accessories, and incandescents which are available from the firm.



ANDERSON ELECTRIC

Performance at Point-of-Contact is what counts! Anderson Electric's new U-bolt aluminum parallel groove connector with COVER ALL spacer . . . maintains cable configuration . . . speeds installation . . . provides more area contact . . . increases range . . . increases pull-out strength . . . assures inhibitor protection.

ANDERSON ELECTRIC CORPORATION
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Aluminum & Bronze Power Connectors • Clamps • Fittings • Accessories for SUBSTATIONS • TRANSMISSION • DISTRIBUTION

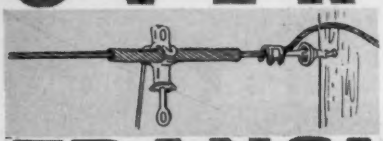
6 WAYS TO PROTECT OVERHEAD TRANSMISSION DISTRIBUTION LINES WITH

ARMOR RODS

To protect and strengthen lines at points of maximum stress or where wear or breakage is likely to occur.

LINEGUARDS

Economical conductor protection where short conductor spans and low tensions are used.



TAP ARMOR

Provides maximum line protection on long spans at the points of clamp attachment.

PATCH RODS

For open-span repairs, where conductor damage is minor and is confined to the wires of the outer layer.

PLASTIC FANNGUARDS

Protect wire coverings and prevent tree abrasion to overhead lines.

FANNGRIPS

Made of galvanized steel, aluminum alloy or copperweld. Powerful non-slip grip makes them ideal for conductor deadending, guying or for service drops.

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NOW . . . through its Plastic Division, **FANNER** offers a wide variety of **INSULATING TUBINGS** and **MOULDINGS** for electrical purposes.

Enter Code Numbers of Catalogs Desired on Coupon on Page 8

1266—Metal-Clad Switchgear

Detailed information on metal-clad switchgear is now available in two special bulletins, 700-B and 7004-C. These booklets give descriptions, application data and specifications on units up to 15 kv and 500,000 kva interrupting capacity. Wire I-T-E Circuit Breaker Co., 19th and Hamilton St., Philadelphia 30, Pa.

1268—Lighting Fixtures

The Perfeclite Co., 1457 East 40th Street, Cleveland 3, Ohio, makes available the following literature: (1) Data Folder 54-B—4 pages of engineering information, prices and specifications on Plastic Indirect Concentric Ring Luminaires. (2) Data Folder EX-55-A—10 pages of information on Exit Units for all building locations. Complete engineering data and prices given. (3) Data Folder 56-A—information on Ceiling Pan Fixtures and Vapor Proof Prismatic Exterior Fixtures.

1280—Electric Heating

Electromode Division of Commercial Controls Corp., 45 Crouch St., Rochester, N. Y., has issued a new catalog listing their complete line of electric heaters, including bathroom, wall-type, portable, baseboard heating, radiant heating panels, various industrial units, and combinations. Also included in Catalog No. 31-K-3 are complete specifications and price list.

1282—Exit Lights

A four-page catalog providing illustrations and specifications for their complete line of exit lights has been released by Curtis Lighting Co., 6135 W. 65th St., Chicago 38, Ill. Types of mountings illustrated include recessed, end to wall, ceiling, direct wall, and pendant.

1284—Electric Radiant Heating

The design and installation of electric radiant heating is covered comprehensively in two publications just released by General Electric Co., 95 Hathaway St., Providence 7, R. I. Designers of heating systems will find valuable information in a 24-page Electric Radiant Heating Design Manual. A 36-page manual explains and illustrates how to install G-E Electric Radiant Heating in homes.

1288—Electric Ventilators

An illustrative 8-page folder, Bulletin 620-L, showing typical installations of a complete line of ventilators for wall, ceiling, laundry, bathroom, kitchen, and small rooms, is available from TradeWind Motorfans Inc., 7755 Paramount Blvd., Rivera, Calif.

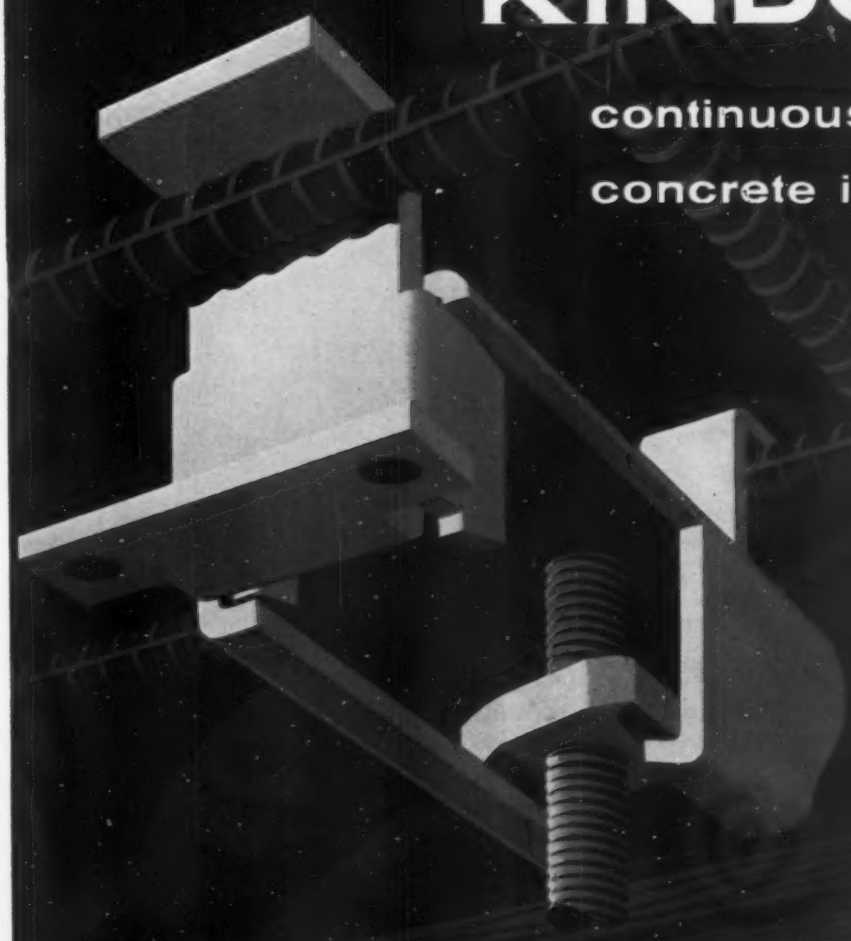
The folder includes dimensional drawings of installations helpful to building and electrical contractors.

1298—Electrical Fittings

The Electrical Fittings Corp. of Woodside, New York (EFCOR) offers a complete catalog covering all types of fittings for all types of raceways and conductors. The catalog also features an extremely comprehensive "What Goes Into What" section covering 5 pages alone.

KINDORF

continuous slot
concrete insert



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... and tomorrow!

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—by providing a simple source of attachment anywhere along its length for hanger rods, brackets or bolted channel assemblies . . . attachments that can be added to, removed or adjusted at any time to meet changing requirements.

A PRODUCT OF **STEEL CITY** ELECTRIC COMPANY, PITTSBURGH 33, PA.

MR. CONTRACTOR:
HERE'S HOW TO
TRIPLE
YOUR
VOLUME!

sell profitable
easy to install

Cavalier Electric Heat

For new homes:

Contracts are often **3 times as big** when homes are heated electrically . . . the efficient Cavalier way. That means you can make **more than 3 times the profit** . . . with just about 20% more labor!

For conversion jobs:

An untouched gold mine, because so few go after the business. Yet surveys show that six **billion** dollars will be spent this year alone for re-doing heating, cooling and plumbing in existing U. S. homes. Get your share—and remember that you always get a full markup on conversion work.

There are wide-open profit opportunities in the contracting trade . . . if you concentrate on selling and installing Cavalier Electric Heat. It's the best line in the business...easiest, quickest installed ...highest quality, fewest callbacks...yields a comfortable profit. Sizes and styles for every heating job, every customer's taste. Investigate today!

WALL INSERT HEATERS 7 SIZES

•

BATHROOM HEATERS AUTOMATIC AND NON-AUTOMATIC

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HEAVY DUTY PORTABLE HEATERS 3 SIZES

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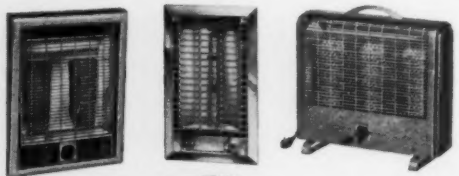
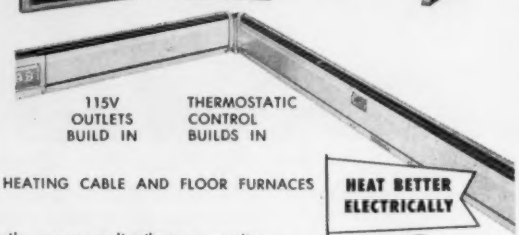
BASEBOARD HEAT 32" AND 48" HEATING SECTIONS



115V OUTLETS BUILD IN

THERMOSTATIC CONTROL BUILDS IN



• ALSO HEATING CABLE AND FLOOR FURNACES

HEAT BETTER ELECTRICALLY

For complete details, see your distributor or write:

CAVALIER CORPORATION

Electric Heating Division
Chattanooga 2, Tennessee

Quality Products Since 1865

Enter Code Numbers of Catalogs Desired on Coupon on Page 8

1300—Lighting Control Switch

The Arrow-Hart and Hegeman Electric Co., 103 Hawthorn St., Hartford 6, Conn., offers a one page information sheet on their new quiet, tap action, lighting control switch, designed to fit any standard toggle wall plate.

1302—F. Lamp Maintenance

An informative folder on Fluorescent Lamp Trouble Shooting is offered by Champion Lamp Works, Lynn, Mass. It features an illustrated trouble shooting check chart. The Champion Lamp Works also has available a helpful slide rule on lamp application, covering incandescent, regular fluorescent, and slimline lamps.

1304—Portable Trench Digger

Stampings Inc., 1017 Mound St., Davenport, Iowa, offers a four page information sheet about the Pow-R-Spade portable trench digger. It was designed to be controlled and handled by one man and digs a neat three-inch wide trench to any depth up to 24 inches.

1306—Fasco Fans

Fasco Industries, Inc., North Union and Augusta Sts., Rochester 2, N. Y., offers a thirty page catalog describing their line of window fans, oscillating fans, hassock fans, kitchen ventilating fans, and range hoods.

1308—Cable Spinners

A complete data file on aerial cable spinners and tools is available from Cable Spinning Equipment Co., 3100 Topeka Blvd., Topeka, Kansas. The file includes reprints of pertinent articles, operating instruction book, and price list.

1310—Vinyl Plastic Tapes

Three booklets just issued describe Dutch Brand vinyl plastic tapes available for a variety of applications. Plastic tapes in colors, pressure sensitive strapping tape, and Trantex Tape designed especially for protection against corrosion are among those manufactured by Dutch Brand Division, Johns-Manville, 7800 So. Woodlawn Ave., Chicago 19, Ill.

1312—Killark Fittings

A new catalog section covers Killark plugs and receptacles in two basic designs: explosion-proof and weatherproof. This new line offers many advantageous features, and is available in many styles and sizes to fit various boxes. Killark Electric Mfg. Co., Easton and Vandeventer Ave., St. Louis, Mo.

1314—Wiring Equipment

Keystone Manufacturing Co., 23328 Sherwood Road, Center Line, Mich., has issued a new catalog (No. 157-A) giving complete specifications and illustrations on their line of wiring installation equipment. Included in the 70 page catalog are wireway and auxiliary fittings, cutout boxes, outlet boxes, switch boxes, and cabinets, giving Code requirements, and price sheets.

GENERAL CABLE

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immediate delivery through over 500 Authorized Distributors!

Make your job easier, save time and money: rely on General Cable's Authorized Distributors for prompt, on-time delivery of your wire and cable needs. Over 500 Authorized Distributors are backed up by large stocks in General Cable's Distributing Centers strategically located from coast-to-coast. For the best in quality and service, buy from an Authorized General Cable Distributor.

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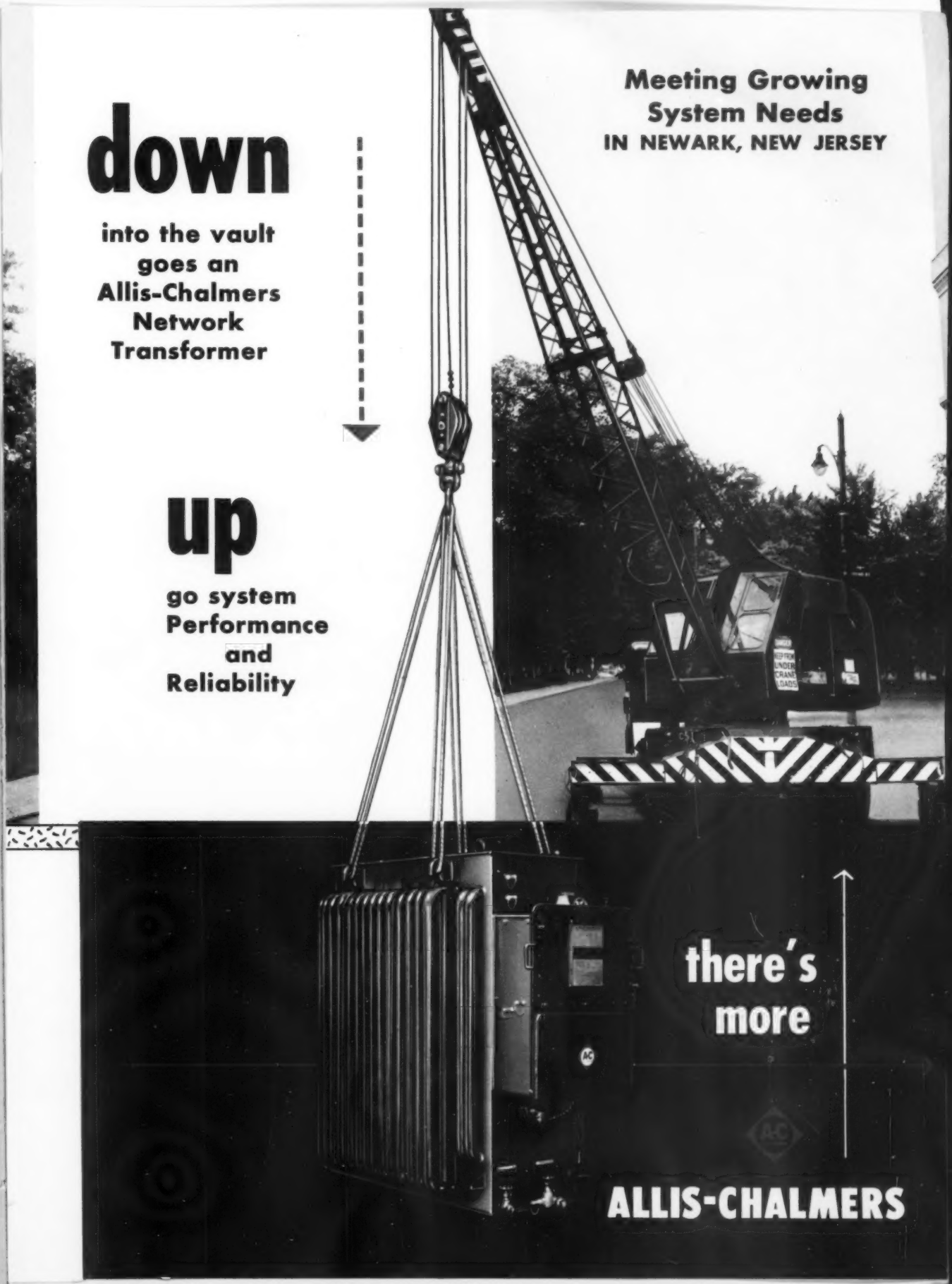
Meeting Growing System Needs
IN NEWARK, NEW JERSEY

down

into the vault goes an Allis-Chalmers Network Transformer

up

go system Performance and Reliability



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into the vault goes an Allis-Chalmers Network Transformer

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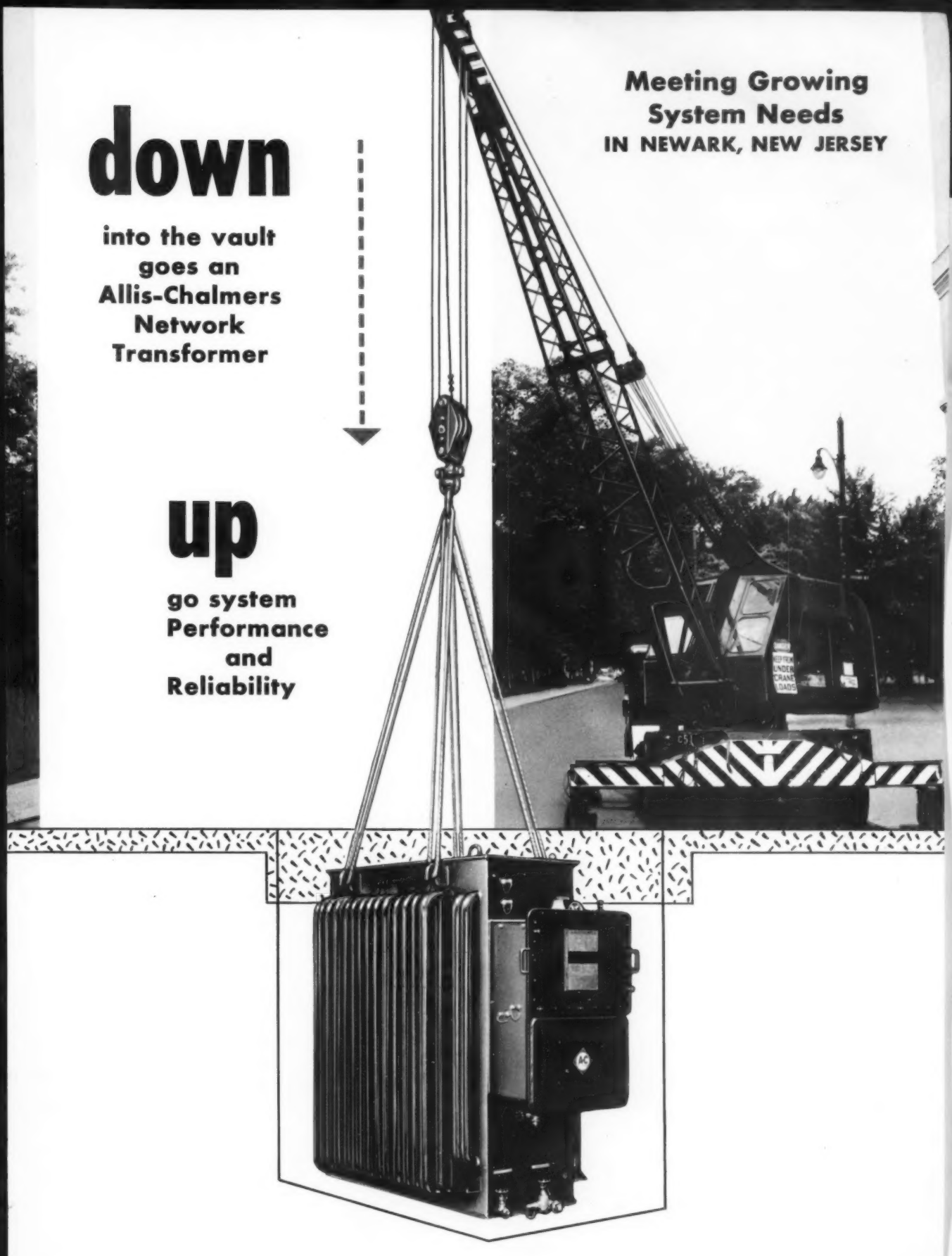
go system Performance and Reliability



ALLIS-CHALMERS NETWORK TRANSFORMERS— The Choice of Utility Engineers Everywhere

Air conditioning and other power demands are putting a squeeze on downtown network systems in city after city. To meet these acute load-concentration needs, Allis-Chalmers network transformers are being installed on many of the most important systems in the country. This wide acceptance, based on an outstanding record of performance, is your assurance of complete satisfaction when you modernize or expand with Allis-Chalmers power equipment.

To Meet Your Growing System Needs

It will pay you to investigate the many advantages of Allis-Chalmers network transformers . . . advantages that have merited the confidence of utilities and consultants everywhere. Get all the facts. See your Allis-Chalmers representative or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

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add Years to Transformer Life

Special Design of Bushing Seal

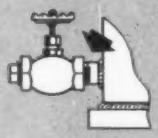
Spiral-wound metallic gaskets adjust to changing operating conditions . . . can be installed without grease or cement.

Protected Against Corrosion and Flooding

Tank surfaces are shot blasted and given three coats of baked-on phenolic base paint. Base and tubes are treated with a protective compound.

Major Gaskets Eliminated

Main cover and switch compartment are welded to tank. Oil sludging and oxidation are minimized.

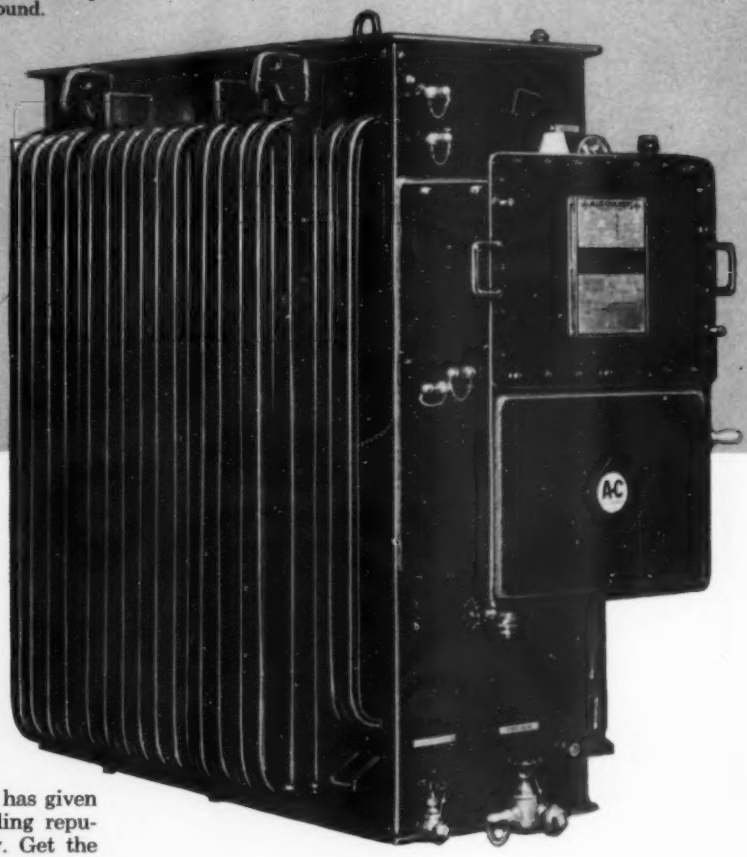


Threaded Valve Connections

Connections are solder wiped for extra protection. Valves are located for easy access. Globe-type valves with nonrotating seats close tight, avoid wear on the valve seat.

ALLIS-CHALMERS

NETWORK TRANSFORMERS



Compact, Low-Loss Design—

Thermal capacities are high for contingency load conditions. Liberal ducts throughout both high voltage and low voltage coils assure ample circulation of cooling liquid.

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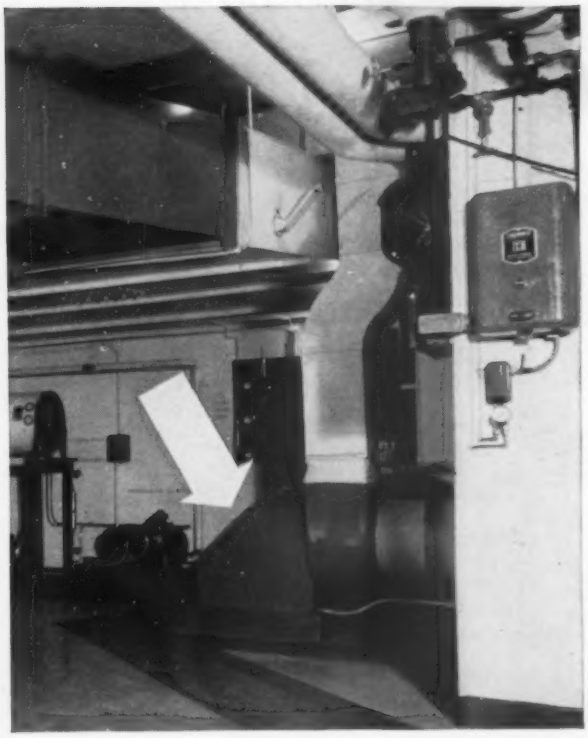

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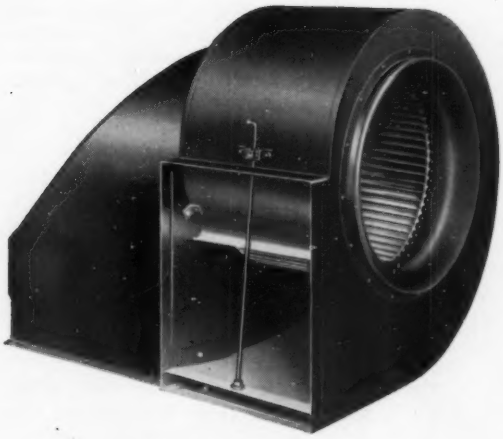

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Adequate tool-up means rewiring

This electrical contractor prefers rewiring jobs to competitive bid jobs. Profitable handling of rewiring requires good tooling, intelligent application of power equipment, and trained men.

By L. H. Houck

This article should be especially helpful to the following readers:

- Electrical Contractors ✔
- Electric Utilities
- Electrical Wholesalers ✔
- Electrical Inspectors
- Industrial Engineers ✔
- Consulting Engineers

◆ ADEQUATE WIRING at the James Electric Company, Sedalia, Mo., represents one of the most profitable segments of its business, according to George James, owner, who has been participating in "Housepower" and "Adequate Wiring" programs for many years.

You have to prepare for profits in the rewiring field with fast and reliable power equipment and experienced men. Mr. James said he had discovered that many prospective customers do not know the meaning of the term "adequate wiring," in spite of its wide publicity. Unfortunately they care little about learning the meaning until the house burns down.

Since you can't wait for the house to burn down to get a rewiring job, James does much promotion along the line which has brought in much profitable and interesting business. He constantly promotes adequate wiring in his newspaper advertising and also uses signs on jobs underway.

The need for adequate wiring is evident all around in his territory and one of the big jobs is to convince the owner that he needs the job.

James recalls one job in particular which proved the need for adequate wiring. A large factory had been in operation for many years with the original wiring. James thought this plant should be rewired for several reasons. From past repair jobs he knew that much of the wiring was in a dangerous condition because of age and deterioration of insulation. Some of the circuits were overloaded and consequently some of the motors were starving for voltage.

But he couldn't convince the owner that a rewiring job was needed. The owner said the machines were running normally, their electric repair bills were not out of line, their power bill was normal and he thought that when things were running all right that they should be left alone.

James explained that wiring this old was certain to be badly corroded from sulphur in the rubber of the old insulation and he suspected some of the wire diameters were now much smaller due to corrosion. He explained that use of smaller wire reduced the amount of current that could be carried which caused a build up of heat and increased the fire hazard.

Since there hadn't been a fire in the plant in its half century of existence, James didn't get far with his sales talk.

But one day he had a repair job at the plant which necessitated removal of part of a panel. James decided to remove the whole front so he could see what some of the wiring looked like in the back, since it involved a number of circuits.

Even James, calloused to bad wiring scenes, was shocked at what he saw. Most of the wiring in the dozen or so circuits was almost totally bare of insulation. A rat could have short-circuited half the plant with a single jump.

James went after the manager and when the manager saw it he was so shaken he couldn't speak for a few minutes. The question then was not how much or what to do but how soon could new wiring be installed and how quickly could James protect the plant until the new wiring was installed.

Now this plant is operating safely with all new wire and a plant owner is sold on the advantages of adequate wiring.

Adequate wiring is hard to sell to the average person whether he is a home owner or a factory owner, as James has discovered. But there are also times when it is easier to sell. James said that when he learns of a person who has bought two or three electric appliances at the same time, he often has a good prospect for a wiring job.

James sets up advertising signs on all his rewiring jobs which call attention to adequate wiring. On residential jobs the sign is placed outside. On factory and large building jobs where an outside sign is not practical he used a framed, glass-covered sign which is hung inside the building. Consistent use of these signs has produced a number of good jobs.

James prefers rewiring jobs to competitive bid wiring jobs on new subdivisions because for him these rewiring jobs are profitable.

But as james points out, rewiring profits are not easy to come by unless the contractor tools up for them, and of all the types of contracts handled by electrical contractors, the rewiring job requires the most tooling and the most intelligent application of power equipment.

Power equipment

"Without power equipment and a full range of sizes, rewiring jobs can become nightmares," James said, "because the ability to use fast power tools to rework old buildings for new wiring systems is what makes profit possible. We even have a 10-ton winch for pulling wire in conduit."

Some of the power tools with which each crew is equipped include electric jig saws, electric hammers, electric drills. With an electric jig saw a place can be cut for a receptacle box in minutes.

profits

The contractor must be prepared to drill and cut steel, masonry, brick, stone, and concrete, and do it quickly and efficiently, James said.

When it comes to hydraulic benders for conduit, James has all the sizes including the largest made. He can cut, thread and bend conduit from the smallest size up to 6-inch speedily with his power equipment. He has a couple of 8½-inch Skilsaws equipped with diamond blades for cutting brick, stone and concrete.

Electric and acetylene welding and burning equipment is also a part of the tool list.

One of his most valued tools is one that is not yet commonly found in the contractor's tool box. It is the portable electric metal cutting band saw. Held free hand it will cut metal at any angle swiftly and is much faster than a power hacksaw.

"We can measure up a bunch of required lengths needed in piping up a big panel with a lot of switchgear and whether the lengths are of a size or different and sizes similar or dissimilar, a pile of conduit can be cut up by one man, faster than you can cut fireplace wood with a power saw," James said.

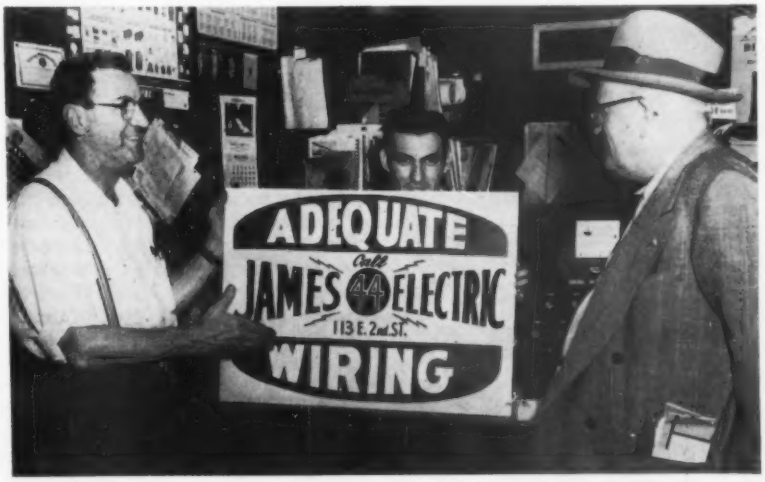
Besides adequate tooling, rewiring jobs requires manpower that knows the business. Men with limited experience often work on standard jobs under competent supervision but rewiring jobs call for ingenuity, the ability to act, and a knowledge of building construction in addition to knowledge and practical experience in electric wiring of all types.

The unexpected is commonplace on rewiring jobs. James recalls a job they had some years ago about 20 miles away in which a 100-year-old farm house was to be rewired. The original wiring was old and primitive and the job called for a new wiring job with a 100-ampere entrance.

How the house happened to live more than 100 years was soon evident when they ran into con-

(Continued on page 36)

Fast power tools and the ability to use them is what makes profit possible in rewiring jobs, claims George James, as he demonstrates his shop drill press on a meter box.



George James shows a prospective customer the adequate wiring sign which is set up outside each job.

Lighting modernization of bank

By James A. Banton

Illuminating Engineer
Tampa Electrical Co.
Tampa, Fla.

This article should be especially helpful to the following readers:

- Electrical Contractors ✔
- Electric Utilities ✔
- Electrical Wholesalers ✔
- Electrical Inspectors ✔
- Industrial Engineers
- Consulting Engineers ✔

◆ WHEN THE directors of the Exchange National Bank, Tampa, decided to remodel, one very strong stipulation was that the lighting should be such that it would preserve, at least in part, the original architecture of the bank. Massive bronze grillwork, typical of bank building construction in 1923 when the Exchange National Bank was built, was among its features.

The ceiling in the large banking room is 28 feet high. Large boxed-in beams span the area from left to right, dividing the ceiling into five large bays or areas. In each ceiling bay were five sets of rectangles within rectangles. In the center of each was a large medallion. Along the bottom of each beam were six medallions similar to those within the rectangles. These medallions and rectangles were ornate plaster creations typical of older banking institutions. The boxed-in beams measured 36 inches across and 28½ inches deep.

In order to preserve at least a portion of the ceiling appearance, we decided on a luminous ceiling installation in each of the five bays, leaving 5½ inches of the

preserves original architecture

lower portion of each beam exposed. The entire ceiling area was painted a flat white, then six continuous rows of nine four-foot fluorescent strips were installed in each ceiling bay. Below this was suspended Gratelight louver diffusers, manufactured by The Edwin F. Guth Company.

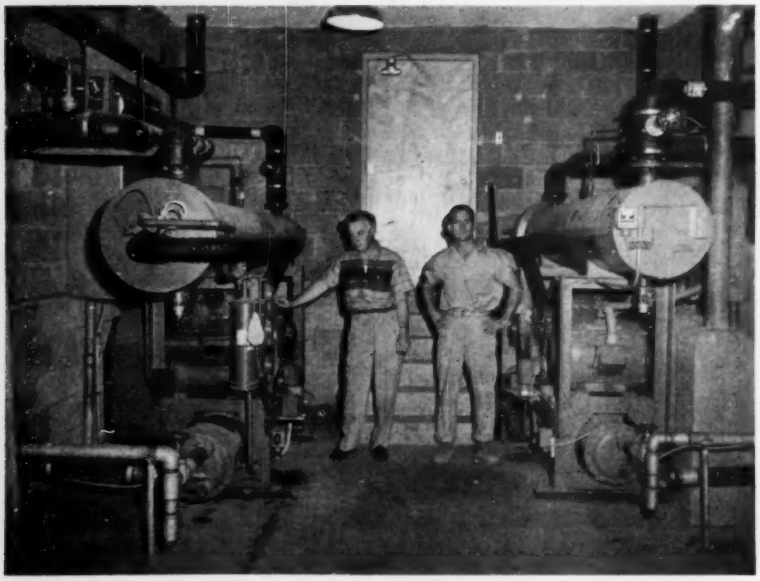
The fact that the ⅜" Gratelite cubicle ceiling was not flush with the bottoms of the beams but was inset 5½ inches, set the beams apart and accentuated the medallions which still appear on the bottom of each. Maintained illumination is approximately 62 foot-candles, and bank officials and customers alike are highly pleased with the installation.

Original plans called for doing all the work after work hours. However, the electrical contractor, Doyle Electric Company, of Tampa, devised a plan whereby work was done during regular banking hours at quite a financial saving to the bank and with no inconvenience to customers.

A track was set up along each wall of the 38-foot wide banking room. A scaffold on rollers with a rolling center support was built on the tracks. The floor of the scaffold was at such a height that workmen could install all of the equipment for the lighting installation in a normal standing position. The scaffold was the width of one bay and was boxed-in on both sides so that any noise or trash was not noticeable to the customers below. Beginning at the rear of the bank, as each bay was completed, the scaffold was rolled forward to the next bay. This was continued until the installation was completed. The method was somewhat of an innovation and, as stated above, represented a considerable saving of time and money.

Large area electrical space

Turner Electric Co., of Knoxville, offers this example of efficient electric heating and cooling of a large building. The 23,083 sq. ft. Municipal Building houses Maryville, Tenn., utilities and city offices.



Earl E. Turner Jr., and David Smith examine electrical heating and air conditioning equipment in the Maryville Municipal Building.

By Warner Ogden

This article should be especially helpful to the following readers:

- Electrical Contractors ✓
- Electric Utilities ✓
- Electrical Wholesalers ✓
- Electrical Inspectors
- Industrial Engineers ✓
- Consulting Engineers ✓

◆ ALTHOUGH electrical contractors are doing many electrical home heating jobs in the South, new larger buildings offer possibilities too.

An example is the job done by Turner Electric Co., 1412 Grand Avenue, Knoxville, at the new Municipal Building in Maryville, Tenn.

There are 23,083 square feet in the building, including main floor and basement. A part of the building is used for municipal offices and the other part for utility offices.

A central electrical heating system was installed, with two 100 kw boilers in a room built on the basement level for heating and air-conditioning equipment. Each boiler is made up of twenty 5 kw units.

The electric boilers are controlled by stepcontrollers and modulated motors. They use an outdoor anticipating thermostat, as well as conventional boiler temperature control.

Changeover from heating to cooling is done simply with a summer-winter switch which is interlocked with the two systems.

Besides the 200 kw in the electric boilers, 70 kw of electric heat is provided in the form of overhead blower type suspended heaters and flush wall mounted heaters. That makes the total electric heat approximately 270 kw.

The ceiling heaters are mostly in

heating

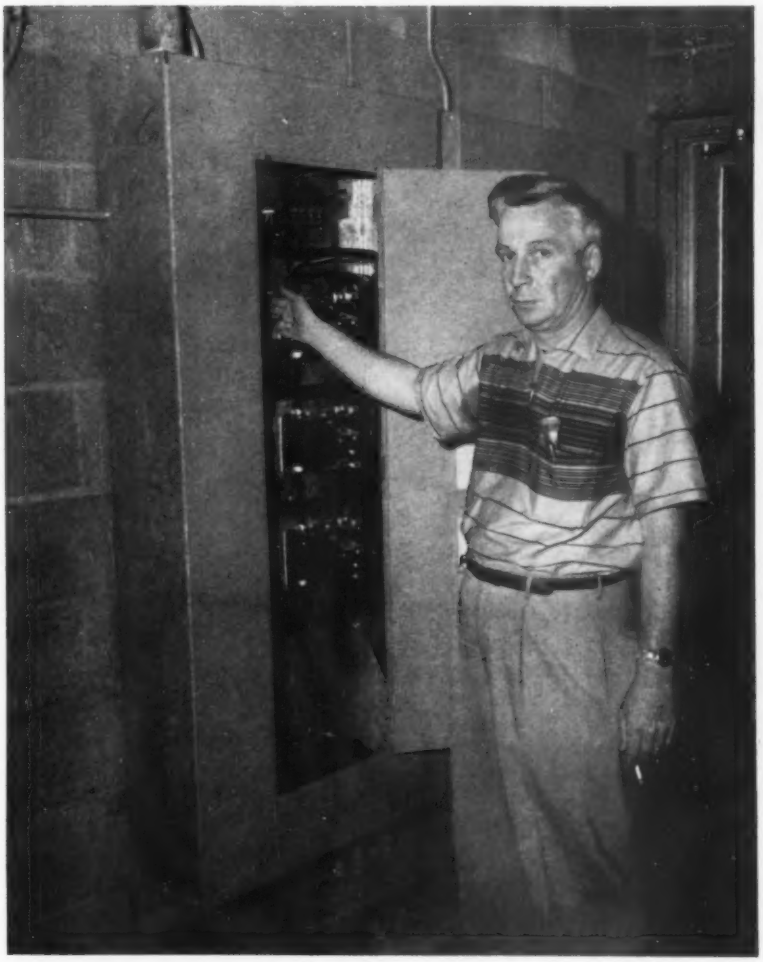
hall and storage areas and the convectors in the offices. Flush wall mounted heaters supply rest rooms and corridors.

In the large lobby, Turner put in a specially-built 8-kw flush wall heater for auxiliary heat.

"When people go into a building they look for something warm in cold weather," explained E. E. Turner, Jr. "They see the wall heater near the entrance and it has a sort of psychological effect. They can go over to it and warm their hands and feet, if they wish, although the building is always comfortable. The wall heater is just auxiliary."

Boilers and chillers supply all the offices that have room convectors. They are controlled with a heating and cooling thermostat in each room. Each room can maintain a separate temperature if desired.

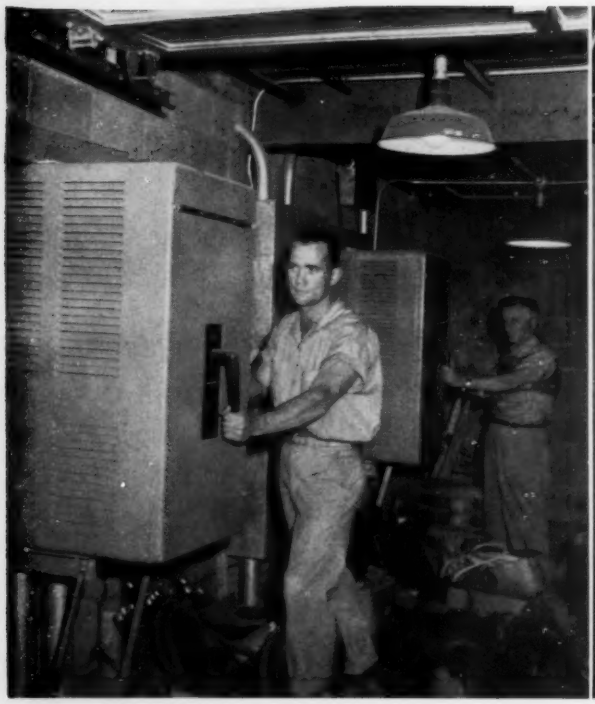
The suspended blower type heaters are controlled with wall-mounted thermostats.



Earl E. Turner, Jr., demonstrates the summer-winter switch control box, where a changeover from electric heating to cooling or reverse is simply done. Switch is interlocked with the two systems.

The 8 kw flush wall heater was installed in the lobby of the Municipal Building for auxiliary heat.

Underfloor outlets and marker screws were installed to provide future electric and telephone additions.



David Smith and Earl E. Turner operate main circuit breakers installed at basement level. At right, David Smith, job foreman for the Maryville Municipal Building, examines electric boiler connections. Besides the 200 kw in the electric boilers, 70 kw of electric heat is provided in the form of overhead blower type suspended heaters and flush wall mounted heaters. Total heat is approx. 270 kw.

Electric service at 120/208 volts, four wire, supplying heating, lighting and air conditioning enters through two 800 ampere drawout type circuit breakers.

Electric valves used

Electric valves are used in the heating and cooling water supply mains. Valves that turn off the hot and the cold are electrically controlled too. The valve turn-off is what circulates cold water and turns on the hot.

Heating of water in a boiler, pumping and circulating through a convector at the proper temperature, is all automatically controlled.

The electrical contractor did all the electrical work, but asked that it be made clear that he did not install mechanical equipment.

"This is one of the largest electric heating loads in the area," says Mr. Turner, 'and Maryville officials seemed very happy with it.

"Using electric heat and automatic controls eleminates need for firemen, janitors and other expense. A lot is gained by saving a fireman's salary.

"We helped make the system not only convenient and bringing comfort throughout the year, but as attractive as possible. Throughout the office area, floor duct was installed for power and telephones. Floor outlets and marker screws were used so that power outlets and telephones could be added if needed anywhere in the future.

"In the cashier's office, we used a plastic luminous ceiling with acoustical baffles for over-all high level lighting and sound level control."

Aluminum was used throughout the building. Alcoa, Tenn., an aluminum center, is the twin city of Maryville, so that aluminum was especially appropriate.

Adequate insulation

A large building for electrical heating should be properly built for it. Insulation was used overhead in the Maryville building, but not in sidewalls. The walls are of concrete block and brick veneer.

Frank Allen, manager of power for the Maryville Utilities System, was asked whether electrical heating in the large building had been satisfactory.

"Yes," he replied, "it has been very satisfactory. We have the two 100 kw boilers. Then in summer we reverse, drawing cool water as a refrigerant and circulating it through the system for air conditioning.

"So we have comfortable conditions in the building the year-around. The building itself is owned by the city and the Utilities Board rents from the city."

Costs reasonable

Mr. Allen was asked about costs and he did some figuring. He found that power for heating, lighting and other needs over the winter months averaged approximately $275 on the utilities side and approximately $175 on the municipal offices side. On the utilities side, the costs ranged from $124 in October to $302 in January. Air-conditinoing runs about $150 a month.

The advantages of electrical heating are worth the cost, officials believe. All who have seen what has been accomplished are impressed and there are many visitors. Similar installation projects have been undertaken elsewhere.

Commercial application of electric space heating

By James O. Rittenhouse
Commercial Sales Engineer
Georgia Power Company
Macon, Ga.

This article should be especially helpful to the following readers:

- Electrical Contractors ✓
- Electric Utilities ✓
- Electrical Wholesalers ✓
- Electrical Inspectors
- Industrial Engineers ✓
- Consulting Engineers ✓

Electric space heating, already well accepted for residential applications, is economically feasible for large commercial installations and offers many advantages over combustive fuels.

◆ OPERATING DATA for a complete heating season on one of Georgia's first large food supermarkets to be heated electrically shows that electrical space heating is entirely practical for commercial installations. Utilizing blast coils in the air conditioning ducts, this installation provides comfortable heating at a cost that compares favorably with combustive type fuels.

The store is the Kwik Chek, one of Georgia's newest and most modern supermarkets, located in Macon, Ga., and is operated by the Winn-Dixie Corp., of Jacksonville, Fla. This store, commissioned in October, 1956, was designed to give it's customers not only superservice, but supercomfort as well.

To accomplish this the Georgia Power Company engineers conferred with the management of Winn-Dixie to determine the cleanest, safest, and most economical method of heating this store. After extensive analyses were made to determine the costs of initial installation, operation, and maintenance, it was very evident that a combination of electrical resistant heat in conjunction with conventional electric air conditioning equipment would be ideally suited for a project of this nature.

Since it was concluded that the above method was the proper approach for comfort cooling and heating, it became necessary to determine the heat loss and heat gains of this structure, and since we are primarily concerned with electric heat in this article, it suf-

(Continued on page 46)

The Kwik Check supermarket was designed for supercomfort.

Billing data and estimated heating cost for commercial electrical heating installation

Months	Total kwh Cons.	Actual metered demand	Counted demand for billing	Total cost
Oct. & Nov.	74,720	122	67	$ 1,197.88
Dec.	42,240	126	67	630.94
Jan.	42,400	126	67	632.17
Feb.	40,960	112	67	617.15
March	42,400	112	67	632.15
April	39,040	112	67	597.52
May	46,080	107	67	671.52

$$\text{Est. kwh for heating} = \frac{(HL/3412) \times DD \times C}{TD}$$

where HL is heat loss in Btuh, DD is degree days for season, TD is difference in inside and outside design temperatures, and C is a constant (16 found to be accurate for installations of this type in Macon area)

$$= \frac{(300{,}000/3412) \times 2049 \times 16}{(70\text{-}15)} = 52{,}150$$

Annual consumption for heating = 52,150 kwh
Annual cost for heating, @ 1¢/kwh = $521.50
Annual heating cost per sq. ft. = 4.7¢
Annual heating cost per cu ft. = .39¢

Electric heating system offers year-round

The all-electric heat pump absorbs heat from cold winter air and pumps heat out of the building in the summer. Interesting comparisons are made between this unit and other heating systems.

By James D. Shaw

Air Conditioning and Heating Engineer, Public Service Company of Oklahoma, Tulsa, Okla.

This article should be especially helpful to the following readers:

- Electrical Contractors ✓
- Electric Utilities ✓
- Electrical Wholesalers ✓
- Electrical Inspectors
- Industrial Engineers ✓
- Consulting Engineers ✓

◆ HOME COMFORT has advanced decidedly since the end of World War II. Today, our customers can enjoy complete air conditioning 365 days a year with only the effort of moving the control dial of a thermostat to the desired temperature and thereafter forgetting the equipment. Our customers can add as many other comfort conveniences as their pocketbooks will afford, such as full humidity control for those dry winter days and dehumidifying control for muggy summer days.

Electronic air filtering will remove practically all of the dust, pollen and other air contaminants. Bacterial lamps can be used to destroy all air-borne bacteria. The air may even be perfumed automatically. These and many other refinements of the art of air conditioning are now available for the customer who desires good and proper comfort.

Heat pump conserves energy

Oklahoma, with uncertain yet mild weather (average winter minimum is 42°, average summer maximum is 91°), is an ideal area for the new all-electric heat pump. This heating and cooling unit is being purchased by our customers to provide them with many advantages over predecessor heating systems. As a heating device it does not generate heat directly within itself, but transfers heat from some source such as outdoor air. It actually absorbs heat from cold winter air and pumps it into the house.

In summer the same motor-driven unit pumps heat out of our homes into the hot outdoor air. The singular advantage of the heat pump is its efficiency as a heating device. Resistance heaters produce 3,412 BTU's for every kilowatt-hour used. The heat pump is able to deliver 8,000 to 12,000 BTU's for every kwh used.

This unusual conservation of electrical energy permits the heat pump in its operation to equal in many cases the cost of operation of combustion heating systems penny for penny.

The heat pump has natural advantages over other heating systems, these being safety, convenience, and the elimination of flues, chimneys, and unnecessary plumbing. Quality heat at less temperature gives the heat pump an added advantage. To supply the same quantity of heat as fuel heating systems the heat pump merely circulates more air at less temperatures within the conditioned space with less likelihood of cold and hot spots.

We remind our customers that the heat pump is not a miracle machine that solves all air conditioning problems. There is much more to an air conditioning system than a fine heating and cooling plant. A conditioning system is as good as its distribution system. The conditioned air must be conveyed to each room in proper quantities and to the area of greatest heat loss.

For rooms with lots of glass, for example, a greater supply of conditioned air is needed than for rooms with insulated walls. It is also logical to supply conditioned air where needed — to the outside wall and glass areas of the room.

The heat pump offers, in this regard, another often-overlooked advantage: The same quantity of air is circulated both summer and winter, instead of different quantities as with combination fuel-fired heating and conventional air cooling systems. This means better distribution for the heat pump system with little or no adjustment necessary in the distribution system.

Sound application engineering for each heat pump installation is offered the Public Service Company of Oklahoma. Since the heat pump is the best heating and cooling system money can buy, it stands to reason that the best planned distribution system must be offered the customer also. We advise our customers regarding the cost of heating and cooling with the heat pump system. To illustrate these points of application and operation we now have records of some 75 customers who have used heat pumps for a year or longer.

Insulation in the structure and on the duct system is another important factor we consider and discuss with our customers. In many cases the few extra dollars invested saves not only cost of operation dollars for both summer and winter, but also lessens the size of equipment needed.

Insulation provides another decided improvement to proper comfort. Insulation lessens cold drafts and hot spots in the home. A very good example of a modern home with extra good insulation is that as represented in Table 1. This home has a 3 hp heat pump installed; with minimum insulation it would have required a 5 hp heat pump and, of course, cost of operation would have been much higher than that shown.

Another example of insulation savings is shown in Table 2. This home has 1,500 sq. ft. We show two equal winter seasons and the cost of operation for heating. The $21.00 savings during the 1956-57 season was due to storm sash added to the windows of this home. The added cost of storm sash was approximately $120.00.

comfort

Another illustration of the savings insulation makes is shown in Table 3. By adding one inch of floor insulation and one inch of added duct insulation, approximately $60.00 was saved on one year's heating bill. Of course, some of this is due to customer's use of equipment, and wind conditions would vary it somewhat, but it is reasonable to assume that a good deal of the savings is due to the insulation.

Resistance heating

The particular heating rate designed by our rate department is applicable not only to heat pumps, but to resistance heating as well. Resistance or radiant heating systems use more kilowatt-hours of electric energy than a system employing the heat pump. But due to the fact that resistance heating is used more hours, the utility can afford to sell the kilowatt-hour at a lower cost. An example of this is illustrated in Table 4 comparing two like homes: one heating with resistance heating and another heating with a heat pump.

These homes are of comparable size and comparable insulation values. The customer employing resistance heating heats his home for $3.00 per month more than the customer using heat pump.

Resistance heat offers the customer many advantages over fuel-fired and forced air heating systems. Each room is individually heated with its own separate heating plant. Each room is thermostatically controlled, thus the temperature is independently selected. When sunshine aids in heating a particular room, a savings results.

Bedrooms needing less heat are set at, say, 65°, thus a savings results. There is little or no upkeep with resistance heating and with many units there is no noise, no moving parts. Installation is simple and the heat can be put directly where needed in the room with no need for a duct system.

Commercial application

Commercial structures in our trade area can be heated with heat

Table 1—Costs for an all-electric home

	Total kwh for all purposes	Total cost	Kwh, heating and cooling	Heating and cooling cost
January	920	$ 17.67	470	$ 3.69
February	920	20.37	505	7.46
March	480	13.36	230	4.58
April	920	18.90	520	6.37
May	400	12.76	120	2.63
June	520	15.53	212	5.88
July	1169	31.53	802	20.67
August	1080	29.53	755	19.53
September	920	25.53	612	15.88
October	600	12.79	100	.92
November	1040	18.94	740	8.91
December	1440	22.40	1040	9.87
Total	10,409	$238.71	6106	$106.39

Costs of operating an all-electric home with 1,500 sq. ft. area. Insulation consists of two inch batts for walls, six inch batts for ceiling, two inches between concrete slab and foundation wall, and double plate or storm sash for windows. Heating season costs $44.43, using 3725 kwh. Cooling season costs $61.96 using 2381 kwh.

Table 2—Effect of added insulation

	1955-56 Kwh heating	Cost	1956-57 Kwh heating after addition	Cost
October	*	*	436	$ 4.19
November	2750	$ 30.52	1607	21.94
December	3296	34.36	2580	32.87
January	4292	49.41	3506	41.91
February	2236	21.48	1634	16.25
March	1640	16.19	1433	13.94
April	1054	8.91	895	8.63
Total	15,268	$160.87	12,091	$139.73

Effect of added insulation for a 1500 sq. ft. home. Savings for heating season only amounts to $21.14 for the added insulation. (*October 1955 is not included to equalize degree days for each year.)

Table 3—Effect of added insulation

	1955-56 Kwh heating	Cost	1956-57 Kwh heating	Cost
October	*	*	462	$ 5.88
November	1804	$ 27.81	824	9.74
December	4080	51.83	3125	33.37
January	4828	52.77	3077	40.15
February	3822	56.83	3150	36.30
March	2452	25.48	2116	26.48
April	1134	11.04	1290	14.41
Total	18,120	$225.76	14,044	$166.33

Savings amounted to $59.43 for the insulation added to this 2,000 sq. ft. home. Insulation during 1955-56 season included four inches in ceiling and one inch on supply ducts, none on return. Insulation after addition: four inches in ceiling, two inches on supply ducts, one inch on returns, one inch on foundation walls or crawl space.

Table 4—Costs for heat pump and resistance heating

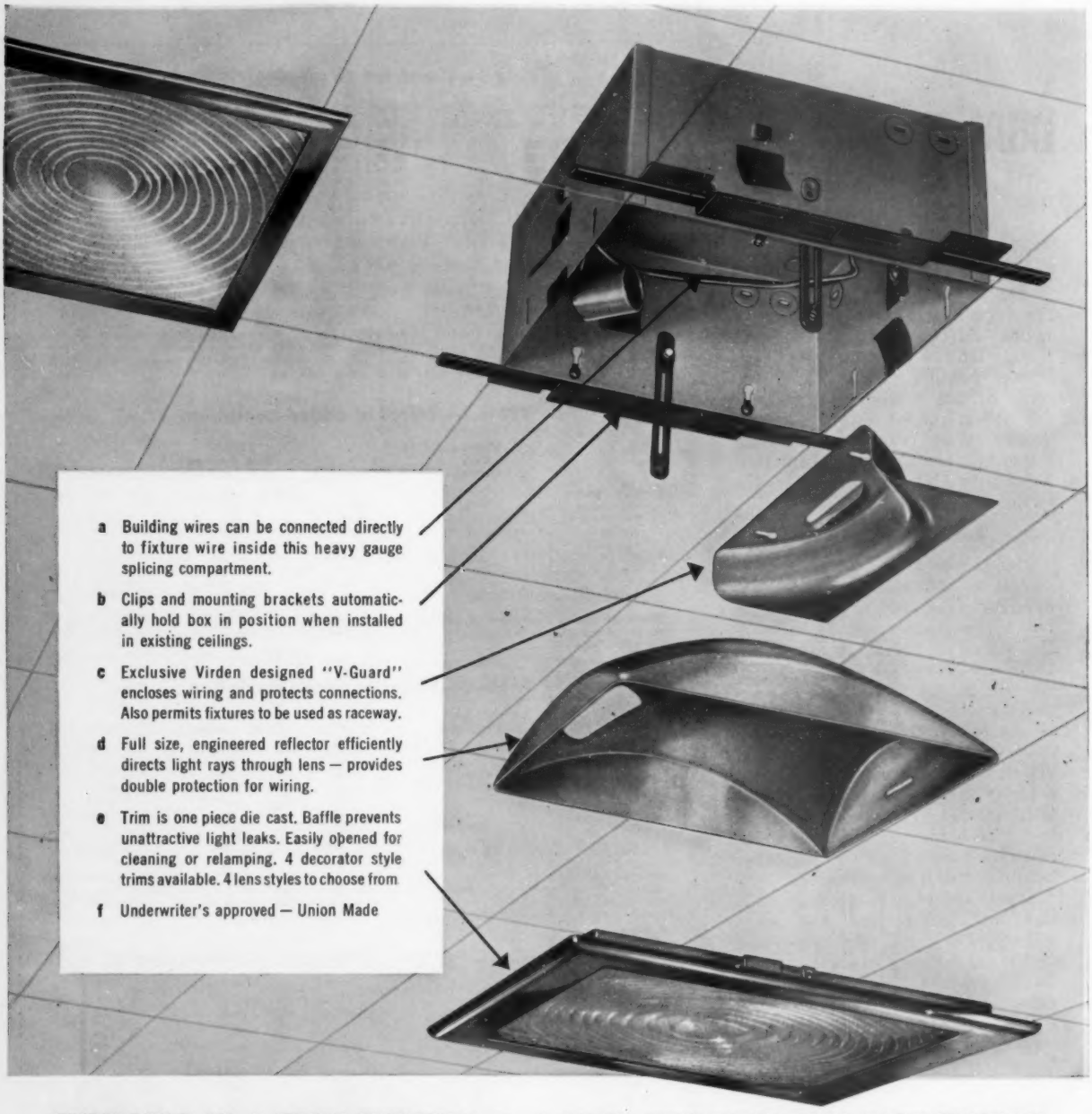
	Resistance heat		Heat pump	
1956-57	Kwh	Cost	Kwh	Cost
October	160	$ 1.73	436	$ 4.19
November	2000	18.07	1607	21.94
December	3605	37.42	2580	32.87
January	3905	41.77	3506	41.91
February	3400	32.37	1634	16.25
March	2300	20.20	1433	13.94
April	1295	10.92	895	8.63
Total	16,665	$162.48	12,091	$139.73

Comparative costs of operating heat pump and resistance heating during 1956-57 heating season, for homes averaging 1,500 sq. ft.

Table 5—Heat pump costs for office building

	Heating and cooling kwh	Kw	Cost—normal comm. rate	Cost—heating rider applied
Jan. '55	4892	25	$ 153.38	$ 97.38
Feb. "	5708	24	163.12	107.12
Mar. "	2368	23	115.52	59.52
Apr. "	3644	27	134.66	78.66
May "	6840	20	176.10	120.10
June "	6240	22	170.10	170.10
July "	9492	24	204.88	204.88
Aug. "	10,652	24	211.18	211.18
Sept. "	7796	24	186.94	186.94
Oct. '54	5472	25	162.08	106.08
Nov. "	1712	24	105.68	49.68
Dec. "	3800	24	137.00	81.00
Total	68,816		$1,920.64	$1,472.64

An annual savings of $448.00 is represented for this McAlester, Okla., office of 5,400 sq. ft. Summer cooling kwh: 44,400; cost: $1,086.18. Winter heating kwh: 23,616; cost: $386.46.



- **a** Building wires can be connected directly to fixture wire inside this heavy gauge splicing compartment.
- **b** Clips and mounting brackets automatically hold box in position when installed in existing ceilings.
- **c** Exclusive Virden designed "V-Guard" encloses wiring and protects connections. Also permits fixtures to be used as raceway.
- **d** Full size, engineered reflector efficiently directs light rays through lens — provides double protection for wiring.
- **e** Trim is one piece die cast. Baffle prevents unattractive light leaks. Easily opened for cleaning or relamping. 4 decorator style trims available. 4 lens styles to choose from.
- **f** Underwriter's approved — Union Made

AVAILABLE IN 4 TRIM FINISHES — 4 LENS STYLES IN ANY COMBINATION

Polished Brass with Albalite Lens

Polished Copper with Bent Decorator Glass

Chromium with Drop Opal Glass

Satin Aluminum with Fresnel Lens

3 SIZES

75-Watt 8 x 8 x 5 Housing — 9¾ x 9¾ Trim

100-Watt 10 x 10 x 5 Housing — 11⅜ x 11⅜ Trim

150-Watt 12 x 12 x 5 Housing — 13¾ x 13¾ Trim

VIRDEN proudly presents the FIRST RECESSED FIXTURE that is INTERNALLY-PREWIRED!*

A major improvement by Virden! Now for the first time *all* wiring connections can be made within the fixture itself. No external outlet box to wire in. Standard house wire is entirely suitable for connections inside the housing. What's more, the unit can be used as a raceway if desired. And it has full Underwriter's approval.

The secret is Virden's exclusive design shown opposite. All parts assemble into one compact, square housing, permitting easier installation especially in areas with close quarters. The patented "V-Guard" covers all connections eliminating the need for an external outlet box. The specially engineered full size reflector not only improves lighting efficiency but serves as an added safeguard for the wiring.

In 3 sizes — 75 watts, 100 watts and 150 watts — the unit features a one-piece die cast trim, baffled to eliminate light leaks. Four trim finishes with four lens styles provide a wide range of decorative lighting possibilities, both indoors and out.

Use this new Virden fixture on your next lighting job. See for yourself how much easier it is to install, the wiring time it saves. Your Virden distributor has these new fixtures in stock now. Order yours today.

(*Patent Applied For)

FOR NEW WORK OR OLD – RESIDENTIAL OR COMMERCIAL

The compactness of this new Virden recessed fixture makes it an excellent unit for new work. It requires a minimum of space. Has mounting brackets and adjustment slots for a tight fit on ceilings. Ample knockouts for fast wire connections. (hanger bars optional)

This new Virden fixture is ideal for installation in existing ceilings, too. Simply cut a hole ⅛" wider than the housing, insert in opening and wire. The special spring clips hold the housing snugly when used in conjunction with the mounting brackets.

The new Virden recessed fixture is excellent for commercial and residential use. Installation costs less and the 4 lens styles and finishes available make possible a wide range of efficient and decorative lighting, indoors and out.

VIRDEN Lighting

virden

John C. Virden Co., Dept. ES, 5103 Longfellow Ave., Cleveland 3, Ohio

Member American Home Lighting Institute

pumps or resistance heaters economically too. Heating and off-peak off-season rates are available eight months of the year for commercial customers. Due to high lighting and people loads in commercial structures, cost of heating electrically is very reasonable. A good example of a building heated and cooled with heat pumps is our McAlester office, Table 5, where four 5 hp heat pumps supply conditioned air to four separate zones in the building.

The total cost of cooling when the normal commercial rate is applied would be approximately $1,086 per summer season. Before the heating rate was applied the cost of operation for winter heating was $834.00. With the new heating rate applied a savings of $448.00 resulted and the cost of heating is now $386.00 per season.

Heat pump experience data

Another company favorably reports their experience with the electric heat pump.

By R. L. Kiddoo
Empire District Electric Co.
Joplin, Missouri

This article should be especially helpful to the following readers:

Electrical Contractors	✔
Electric Utilities	✔
Electrical Wholesalers	✔
Electrical Inspectors	
Industrial Engineers	✔
Consulting Engineers	✔

◆ THE EMPIRE DISTRICT Electric Company approached the promotion of electrical heating, and especially the heat-pump, with a degree of caution. It was felt that it was preferable to undertake a number of heat-pump installations, distributed over the company's territory, and observe the performance of these installations carefully before undertaking active promotion of this equipment.

The first unit sold was installed in the home of William Short, an employee, on February 29, 1956. This residence is a one-story ranch type brick-veneer structure measuring approximately twenty-eight feet in width by fifty feet in length. It has six rooms and two baths. There are two adults and two children in the family.

The home was designed for outdoor temperatures of 100 degrees F. in summer and 0 degrees F. in winter, and an indoor temperature of 75 degrees F. both winter and summer. Six inches of insulation was used in the ceiling in a vented attic; and four inches of insulation was used in the walls. One inch of insulation was applied under the floors in an unvented crawl space.

The maximum consumption of Mr. Short's heat pump during the cooling season was 1396 kwh in July 1956, with a measured demand of 7.2 kilowatts. During the heating season the maximum month's use was 2620 kwh in January 1957 with a maximum demand of 11.5 kilowatts.

To date, the company has installed twelve units, totaling 44 tons in residences and eight units totaling 32 tons in commercial establishments, or a total of twenty units representing 76 tons. The company expects to sell a number of additional units during the remainder of 1957.

In order to encourage residential electrical heating during the winter or heating season, the company has filed a rider to its rates for residential service which provides that during the months of October through May of each year a discount of one cent per kwh shall apply to kwhs which are in excess of 600 kwh and in excess of 25 per cent of the maximum monthly use during the previous period of June through September, up to a total of 150 per cent of such preceding peak month.

Since the trailing step of the company's residential rates is 2¼¢ per kwh, this means that residential air-conditioning can be sold for 2¼¢ per kwh and a major portion of residential heating can be sold for 1¼¢ per kwh.

Since the installation of these units, representatives of the company have called upon each customer and have discussed the operation of the equipment. One or two installations have required individual service and attention during the initial stages of operation, but all customers have expressed satisfaction with the operation of their equipment.

In particular, they have been gratified with the greater degree of temperature control, the freedom from dirt and redecorating costs, freedom from colds, and greater safety.

Utility rates modified to promote space heating

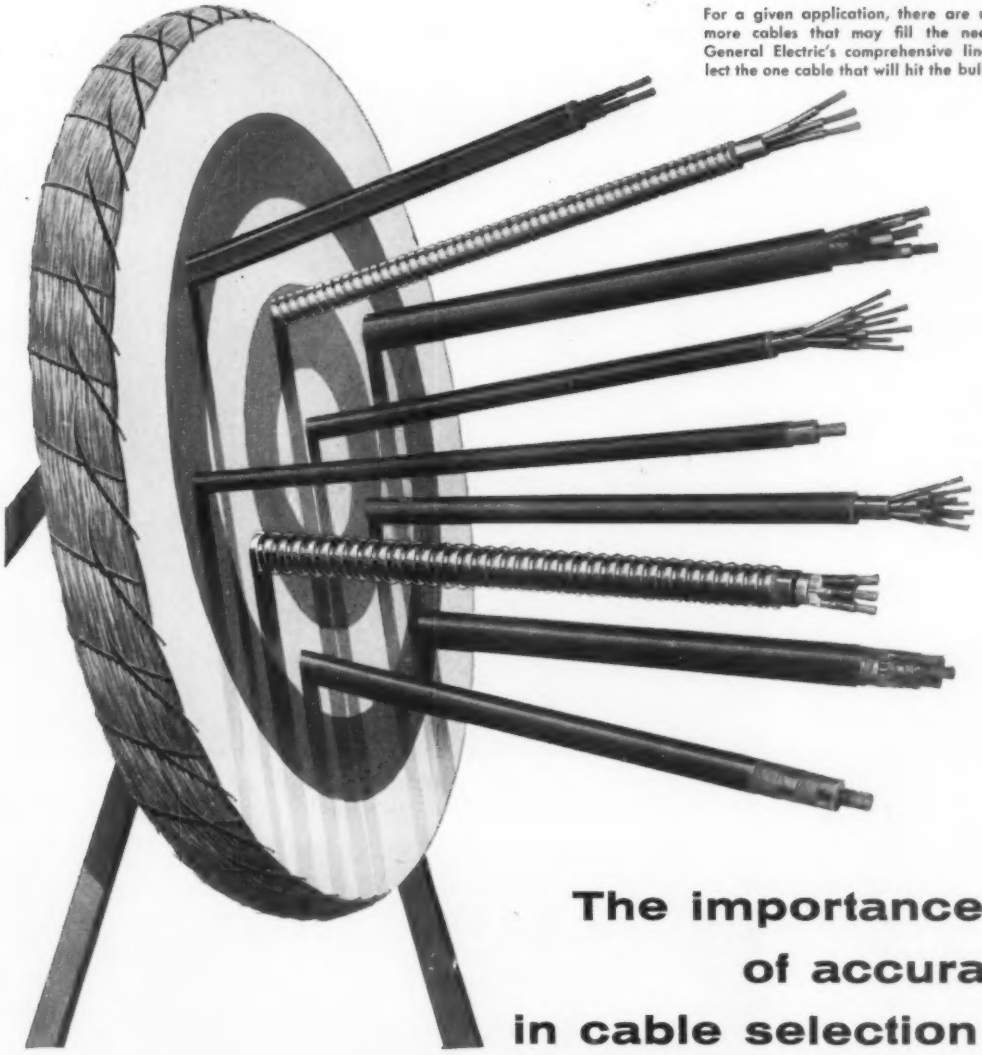
◆ LOWER ELECTRIC rates for home heating have been placed in effect by Arkansas Power & Light Company.

This rate applies to home use of electricity for heating by electric resistance heating or the heat pump. It provides a reduction in the cost for electric heating used by residential and farm customers during the six winter months, and applies to bills rendered after November 1 through April.

Any residential or farm customer may use electric heating under the new rates who has a heat pump or four kilowatts of electric resistance heating.

"This new, low rate for electric heating reduces the cost per kilowatt-hour to 1.2¢ for all usage in excess of 500 kilowatt-hours per month. This reduces the cost for heating purposes by .7¢ per kilowatt-hour, or more than ⅓," according to Vice-President W. M. Shepherd of Arkansas Power & Light Company. "It is the first time that the company has offered a special wintertime rate that puts electric heating within reach of

(Continued on page 36)



For a given application, there are usually one or more cables that may fill the need. And from General Electric's comprehensive line you can select the one cable that will hit the bull's-eye for you.

The importance of accuracy in cable selection

Today, selection of the best wires and cables for your customers' particular needs demands that a wide variety of factors be considered, ranging from standard requirements such as flame-resistance, heat-, moisture-, and weather-resistance — to special constructions which withstand vibration, the electromagnetic effects of adjacent power cables — even the effects of atomic radiation.

General Electric has developed hundreds of cables for just about every possible application. Thus, General Electric engineers are never limited to one wire or cable for a given job but can suggest the most efficient and economical solution for the particular situation.

This is one of the important reasons why many electrical contractors work with General Electric wire and cable engineers when they're planning important wiring jobs. Another reason is General Electric's knowledge of the requirements of other basic components of power distribution systems—transformers, load centers, switchgear, etc.—the knowledge that the right cable plays an important part in satisfactory system performance.

All this adds up to experience that can benefit you. Take advantage of it the next time you have a cable selection problem. For information on your specific wire and cable application or selection problem, see the G-E wire and cable specialist in your locality or write Section W207-824, Wire and Cable Department, General Electric Company, Bridgeport 2, Connecticut.

LIVE BETTER ELECTRICALLY

Progress Is Our Most Important Product

GENERAL ELECTRIC

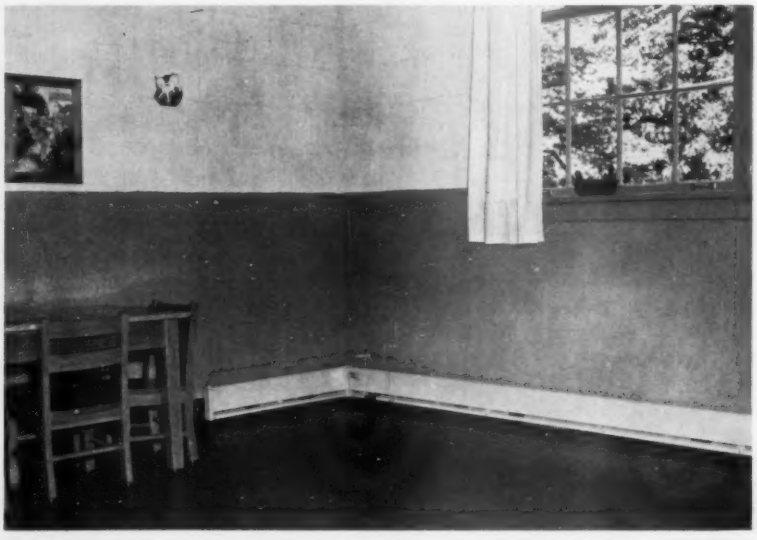
Church annex heated electrically

By James C. Jumper
Electric Heating Division
Cavalier Corporation
Chattanooga, Tenn.

This article should be especially helpful to the following readers:

- Electrical Contractors ✔
- Electric Utilities ✔
- Electrical Wholesalers ✔
- Electrical Inspectors ✔
- Industrial Engineers ✔
- Consulting Engineers ✔

Exterior view of the modern educational building of Signal Mountain Baptist Church heated by 75 kilowatts of electric baseboard heaters.



Extended run of Cavalier electric baseboard in the 6 to 8 age group class clearly shows flexibility of the system. An inside corner permits the run to extend down side wall giving required wattages.

◆ The Signal Mountain Baptist Church, Signal Mountain, Tennessee, last year opened their new educational building—an awaited dream realized, to care for the increasing numbers of children in the church.

After several months of planning, and at a cost of $52,000 adequate space was provided for the children so they could worship and study in complete safety and comfort. Concrete block construction with cork tile floors, two stories, the educational building affords the children the utmost in space and facilities.

How to heat the building was a problem to consider. Electricity was chosen because of its many advantages over other types of fuels available in the area. Electric baseboard was chosen because of its advantages—ease of installation, operation, maintenance, and economy. The big factor was safety, especially needed with children. The low surface temperature of 125 degrees maximum assured complete safety, both to children and to furnishings. The contract was awarded Collins and Hobbs, general contractor, and McKenzie Electric Company, Electrical Contractor, both of Chattanooga, Tennessee. These firms agreed to use the electric baseboard specified.

With the cooperation of the Electric Power Board of Chattanooga the utility serving the area, the heat loss was calculated, and proper wattage recommended and installed. A total of 75 kilowatts of electric baseboard were installed along the outer walls of the building, putting a curtain of warmth between the children and the cold outside.

Convenience outlet sections were installed in several rooms to serve lamps, projectors, and other appliances. These outlets, which build right into the baseboard lineup, with the combination of 32 and 48 inch heating sections, and baseboard thermostats, made a very neat installation, requiring no usable wall space, and fitting

Your Westinghouse representative can prove...

6 MAJOR TRANSFORMER IDENTIFICATION IMPROVEMENTS

Simplify selection, maintenance, inventory, load monitoring. New serial and style numbers on larger nameplate give complete transformer description instantly. Protective link and LV lead identification, new kva Vinyl-Cal and offset breaker handle identify 20% greater overload capacity . . . all measurable in operating dollars saved.

J-70795

YOU CAN BE **SURE**...IF IT'S

Westinghouse

F. T. Hausle, Distribution Design Engineer of Long Island Lighting Company, one of the three utilities who did experimental engineering and field load testing of both old and new Type CSP® transformers, agrees with Tom Oliver, Westinghouse representative, that "positive identification has always been significant in resolving operating, purchasing and engineering problems of transformer use."

snugly out of the way on the outer walls.

The building has a total of 11 class rooms of various sizes, the pastor's study, office of the church secretary, and one large assembly room. A particular room to note is the 6 to 8 age group class. As enrollment of the class exceeded that of an average class, partitions were erected, dividing the large room into three classes. (Pictured is the baseboard heat installed to heat this room, using the inside corner piece to continue the run of electric baseboard.) Electric baseboard along the outer walls of the room heats all three classes with ease. A reading of 72 degrees was maintained in this room also, and either raised or lowered depending upon the desire of the class. Another feature setting off this modern electric installation—the ease to control the temperature in each classroom at its own desired temperature. Baseboard in this room is not painted although paint can be used on the baseboard in perfect safety. It won't peel or blister.

The economy of the installation proved another point. Some members expected rather large electric bills, but results of the first heating season proves the cost was very nominal. The figures shown are the heating bills submitted to the church during the period designated. When we consider that the janitorial department was free to perform other duties, pausing only long enough to set the thermostats on Saturday and turning off Sunday evenings, the cost is again set out as an outstanding feature of this modern electrical servant. With a design temperature of 5 degrees and 3500 degree days, the cost of operation is considered very reasonable.

There is a total of 75 kw of electric baseboard installed, served by a 400-ampere service entrance to adequately serve heating, lighting and kitchen facilities, and appliances. Actual electric bills for first twelve months of operation were: (1956), August, $18.50; September, $7.10; October, $7.10; November, $42.80; December, $78.60; (1957) January, $134.40; February, $141.40; March, $127.40; April, $106.00; May, $42.00; June, $36.40; July, $36.40; with a total of $778.10.

Reverend David R. Walker, Pastor, stated, "Members of our church may now worship with complete assurance of safety to their children during services. We are more than pleased with our heating system."

With electric heating becoming more in demand each day, more churches will consider this modern way to heat. It can be done economically in most areas now.

The cost of installation of electric baseboard heating was about one-fourth that of a boiler type installation. This reduced the total cost of the building, and total interest on the building loan, saving the members several thousands of dollars. Consider also that when additions are needed, it will be necessary to only install several sections of baseboard to adequately heat the additions. No worry about another boiler, or room, or larger furnace. It was truly the ideal heating system to install then, and if future additions are needed, it will be used again.

Utility rates

(Continued from page 32)

thousands of our customers.

"This special heating rate opens the door for many customers who will find it desirable because of the comfort, cleanliness, safety, and low cost of installing and using electric heat."

Where the customer has a heat pump or resistance-type heating, the new electric heating rate reduces the price of all kilowatt-hours used in excess of 500 per month during the heating season from 1.9¢ to 1.2¢, or 36%. The company's regular rate applies for all usage up to 500 kilowatt-hours per month.

To prepare for this new rate, Arkansas Power & Light Company has trained a number of its sales personnel as electric heating specialists. At least one of the specialists is located in each of the company's seven geographic divisions, with headquarters in Little Rock, Pine Bluff, Hot Springs, El Dorado, Forrest City, Searcy, and Harrison.

* * *

ELECTRIC space heating recently got an aggressive push forward in the 27,500 square miles served by The Kansas Power and Light Company. The big push was a new low rate for residential electric space and water heating.

The portion of the new rate schedule pertaining to space heating is a simple block rate which provides, in part, that "if a customer permanently installs and uses equipment for electric space heating in his residence of not less than two kilowatts capacity, and has so informed the company, all kilowatt-hours used in excess of 1000 per month on bills dated November 1st to May 31st inclusive shall be at 1.25¢ per kwh."

The company expects the new low rate will result in a substantial increase in the demand for electric heating installations. KPL bases part of its expectations on a sharply rising consumer interest which is being shown in the new rate structure.

Another reason for KPL's optimism is that Kansas has a number of areas where natural gas is not available. Even where natural gas is piped, electric heating has been relatively popular on the old, less favorable rate structure.

Most of KPL's residential electric customers live in areas where natural gas is plentiful and low-priced. Kansas' winter heating degree days average around 5,100 on a 65° base. Common design temperature is from 5° to 10° below zero.

On the other side of the climate picture, summers are generally hot, and there has been a spectacular increase in air conditioning during the past few years. This increase has come with small promotional effort and has resulted in power plant and electrical distribution system peaks far in excess of those during the winters.

Adequate tool-up

(Continued from page 21)

cealed foundation underpinnings made from walnut logs more than 12 inches in diameter. They also learned another thing—walnut is very hard when it is very old—edges of wood bits were dulled in a few revolutions.

"Even though it is hard to sell adequate wiring to a man who does not understand that his wiring system is overloaded, you can, at least, be prepared for the job that is to come," James said, "because sooner or later they'll add the appliance that breaks the back of the camel and then they'll have to call in an electrician."

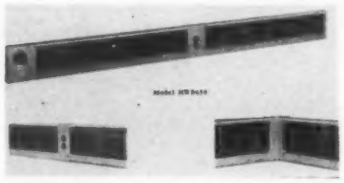
Right now, James said, air conditioning creates a lot of rewiring jobs. An inadequately wired air conditioning unit just won't cool as well as one operating on a good circuit and a customer who isn't getting results is ready to talk about wiring.

Electrical heating products parade

Berko

A SLIM DESIGN baseboard glass radiant heater that actually extends only 1¾ inches, without being recessed has been perfected by Berko Electric Manufacturing Corp., 212 Jamaica Ave., Queens Village, N. Y.

This baseboard system includes several other innovations designed to increase efficiency, the most important of which are a new baseboard level thermostat which can control up



to seven 650 watt heater sections, a duplex electrical outlet section, a 90° internal corner section and a wire raceway provided at the bottom of the unit to accommodate and simplify the wiring. Ratings are 650 watts, 240 volts, 2218 Btu. Length of each heater section is 36¾".

For additional data, ask for item H-801, using the coupon on page 94.

Thermador

A NEW built-in fan-heater combination is now being offered by the Thermador Electrical Manufacturing Co., 5119 District Blvd., Los Angeles 22, Calif.

These individual, heavy duty wall insert electric fan type heaters draw cool air into the heater, then force

this cool air through a scientifically designed heating chamber and gently distribute warmed air downward to circulate throughout the "living zone" of the room.

Each heater has conveniently grouped top located finger-lift switches for fan and heat, neon indicator light, thermostat for automatic control, and safety thermo-cutout. Fan circulates heat in winter and provides an ideal air circulation in summer. The exclusive Thermador Thermostatic Comfort control makes possible individual room or zone control of heat tailored to the needs of the occupant affording a flexibility impossible with a single centrally located thermostat.

Smartly styled grille and frame project less than one inch from the wall giving virtually a flush appearance. The front grille is removable for easy cleaning without removing the entire heater providing complete accessibility. All mounting screws are completely hidden.

The Thermador "NW" Heater is designed to fit between 16" o.c. studs; requires no special framing and can be easily installed in existing walls. Vents or flues are not required.

All models have the same physical dimensions with a wall box size 18⅞" high x 14⅛" wide x 4" deep; operate on 240 volts, a-c, 60 cycles. Available in 2000, 3000, 4000 and 4500 watts with or without thermostatic control.

For additional data, ask for item H-802, using the coupon on page 94.

General Alliance

A NEW convection perimeter baseboard electric heating system has been introduced by the General Alliance Corp., 2105 Moore St., San Diego 1, Calif. The units are only six inches high and range from lengths of 24 inches to 96 inches.

Built for a lifetime of service is a heavy duty nichrome element embedded in a steel sheath 5/16 inch thick having continuous fins with a diameter of one inch. As the element is heated the cold air is drawn in at floor level and rises over the finned element. Through the efficiency of the heater's patented design there is a rapid expansion of the heated air, creating a gentle curtain of rising warm air to the area being heated.

A complete low priced line of accessories are available: Model BPR, a 115 volt duplex convenience receptacle; Model BIC, an inside corner piece to join two heaters at a corner; Model BT, an efficient matching 13.5 amp thermostatic control section. Whenever double pole cut off is required, double pole switches are available on special order on all heaters as well as on the BPR or BT accessories, at a slight additional charge.

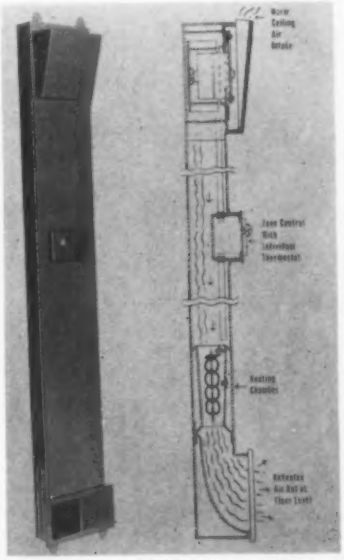
Also included in the General Alliance line are the radiant ceiling heating cable system and radiant heat glass panels available for surface or wall insert mounting in baseboards and walls.

For additional data, ask for item H-803, using the coupon on page 94.

Electrend

AN IMPORTANT new engineering development has been incorporated in the forced air heating system manufactured by Electrend Products Corp., St. Joseph, Michigan.

A highly sensitive hydraulic action thermostat, designed especially for electric heating, maintains a minimum of ½° temperature differential.



In conjunction with the thermostat a bonnet control has been added, which operates the fan independently of thermostat action. The fan now distributes all heat generated within the heating chamber before shutting itself off. Through the incorporation of the new control system, a silent off-and-on action has been accomplished and the relay formerly used has been eliminated.

Electrend utilizes the efficient counterflow principle of "turning the room air upside down." That is,

drawing the already warm air from below the ceiling and recirculating it down through a duct installed within the wall. The necessary additional heat is added as it passes through an electric heating chamber and then is delivered out into the room just above floor level.

Electrend systems operate the fan only during the hot seasons, thus offering a built-in fan in every room for summer air circulation. A new rotary three-position switch, which adds to the decor of the room, controls the fan. A specially designed air intake scoop, accoustically baffled, reduces air movement to a whisper.

For additional data, ask for item H-804, using the coupon on page 94.

Radiant

CONTRIBUTING considerably to winter comfort in the home, particularly for infants and children, are the two new devices manufactured by Radiant Products, Inc., of Monroe, N. C. The first of these is an attractive and conventional looking electrically heated pad to cover the bottom of a child's play pen, and the other is an electrically heated pad to be used in the home or office under rugs and carpets. They both provide comfort

economically by low temperature radiant heat, the kind of heat that can make one feel warm even in a room in which the ambient air temperature may be too low for comfort.

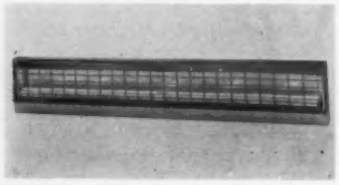
The Kozy electric floor pad comes in the following sizes and wattages: 22 x 34 inches, 87 watts; 34 x 48 inches, 200 watts; 34 x 68 inches, 264 watts; 68 x 68 inches, 528 watts; and 68 x 101 inches, 792 watts. The larger sizes are hinged for ease of handling so that the folded size in each case reduces to 34 x 68. Multiple units of these sizes may be used in larger areas. The floor pad is ¼-inch thick and may be installed under rugs or carpets or be used without covering.

The Kozy Kiddy pad is of standard size 36 x 38 inches, is acid- and water-proof, and comes in attractive colors. Power consumption is 80 watts. Layers of cotton batting on both sides of the element are used for softness, and the outside cover is washable vinyl plastic, embossed on the top and plain on the bottom.

For additional data, ask for item H-805, using the coupon on page 94.

Ampere

ALL-RADIANT baseboards, made by Ampere Industries, 60 Boston St., Newark 3, N. J., utilize the exclusive Amp-quartz element that has an extremely high radiant efficiency of over 91%. Amp-quartz is completely transparent to infra-red rays and re-



sults in a supremely comfortable type of heat that is all-radiant and free of convection currents.

Impartial laboratory tests show that the Amp-quartz element is very efficient in producing useful radiant heat. The all-radiant heat is distributed quickly and evenly throughout the entire room. There are no fans, no drafts, no hot spots, just gentle heat that warms surfaces and bodies without drying out the air.

This high radiant efficiency means low cost operation and top performance under all conditions: the Ampere 1000 watt baseboard will heat an average 9 x 12 room 0° to 70° in jig time.

Ampere all-radiant baseboards are manufactured in 600, 1000, and 1500 watt ratings. The units are modern in design, attractive and compact, width being only 2" and height 8". They may be painted to match decor of room, and are maintenance free.

All Ampere all-radiant heating equipment (heat-n-lite unit and baseboard) feature dual voltage and may be used on either 120 or 240 volt circuits.

For additional data, ask for item H-806, using the coupon on page 94.

Arvin

COMBINING beauty with utility, the radiant heat screen manufactured by Arvin Industries, of Columbus, Indiana, takes the form of a three-panel screen 55 inches high and 64

inches wide, having 20 square feet of radiant heating area.

A luxurious appearing piece of furniture as well as an efficient heating unit, the screen is ideal for use anywhere in the home, in doctors' offices, hospitals, rest homes, and other institutions, schools, office buildings, hotels, and motels.

The heat can be focused directly on an individual by turning in the "wing" panels. The infrared heat rays keep a person comfortably warm but the screen never becomes hot to the touch and will not burn or scorch anything coming in contact with it. If the panels are closed or the heater accidentally falls over, the unit is turned off automatically."

The "Mylar" and insulator board direct all of the heat rays through the front of the screen. If you place your hand against the back, you can feel the warmth, but if you remove it from direct contact, you feel no heat.

Controls are located at the top of the center panel. There is an on-off switch and a pilot light that glows when the heater is on. The screen may be folded to a single panel width only three inches thick for carrying and storage. An 11-foot cord can be detached both at the electrical outlet and at the screen so the unit can be used as a divider or decorative screen if desired.

Operating on 110 volt alternating current, it can be plugged into any normal household outlet.

For additional data, ask for item H-807, using the coupon on page 94.

Mitchell

THREE new lines of reversed cycle heat pump air conditioners, featuring a newly developed instantaneous reverse cycle switch as part of the Weath'r dial, were recently announced by the Mitchell Manufacturing Co., 3200 West Peterson, Chicago, Ill.

Units equipped with the heat pump

IN CONCRETE, TOO, THE BEST COSTS LESS INSTALLED

Smooth-Bending Republic ELECTRUNITE E.M.T.

Western Electric's new distribution center in Solon, Ohio, called for thousands of feet of lightweight raceway. Hatfield Electric Company, contractors on the job, specified Republic ELECTRUNITE E.M.T. because of results it had given them in the past—easy, economical installation, great dependability.

The high ductility of ELECTRUNITE E.M.T. leaves surfaces smooth and unwrinkled after bending. Compression-type couplings and connectors mean no threads to cut, no runs to turn. The light weight of ELECTRUNITE E.M.T. makes for ease of handling. Exclusive "Inch-Marks" and "Guide-Lines" make any installation easier. For these reasons, costly delays are eliminated . . . work goes ahead on schedule.

ELECTRUNITE's tightly adhering galvanized coating protects against corrosion. It won't chip or flake off during bending. And because threading is not required, this coating remains unbroken. Hundreds of millions of feet of this quality conduit have been installed in concrete. Installations made more than 25 years ago continue to report trouble-free service.

Ease of installation and proved dependability are BIG reasons for checking the many advantages of Republic ELECTRUNITE E.M.T. It's produced to ASA Specifications C-80.3, Federal Specifications WW-T-806 latest revision, and carries the Underwriters' Seal of Inspection. Send coupon today for additional information.

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

COMPRESSION-TYPE COUPLINGS AND CONNECTORS mean no threads to cut, no runs to turn. This is a real advantage, particularly where space is limited. In addition, ELECTRUNITE E.M.T. offers many exclusive features. "Guide-Lines" keep bends in the same plane. "Inch-Marks" divide every length of Republic ELECTRUNITE E.M.T. into feet and inches—make quick measurement a cinch. "Inside knurling" reduces friction —makes wire-pulling as much as 30% easier.

Western Electric Co., Cleveland Distribution Center, Solon, Ohio
General Contractor—Albert M. Higley Co., Cleveland, Ohio
Architect—Lockwood-Greene Engineers, New York, N. Y.
Electrical Contractor—Hatfield Electric Co., Cleveland, Ohio

REPUBLIC STEEL CORPORATION
STEEL AND TUBES DIVISION
DEPT. C-3840-A
227 EAST 131st STREET, CLEVELAND 8, OHIO
Gentlemen:
Please send me additional information on Republic ELECTRUNITE® E.M.T.

Name_____ Title_____
Company_____
Address_____
City_____ Zone____ State_____

are available in ¾, 1, 1½, and 2 hp sizes. High capacity and instantaneous change-over arrangement, and a greatly reduced refrigerant flow 'hiss,' are advantages claimed by the heat pump line.

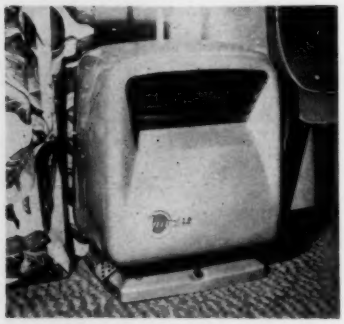
In addition to the complete range of sizes, the units are offered in three separate styles: Mitchell's Roto-Cone, Ultra-thin and Advance models. This means that a Mitchell dealer can sell a room air conditioner for 9 to 12 months continuous service.

For additional data, ask for item H-808, using the coupon on page 94.

Preway

PREWAY INC., of Wisconsin Rapids, Wis., is now marketing a versatile electric space heater known as the "Vectaire."

Based on the jet convection principle, Vectaire produces a steady stream of heated air averaging 135 feet per minute in velocity. The Vectaire has no moving parts, hence is entirely silent in operation. Its exterior case is always cool, safe for children to touch when it is on. The portable



model can be moved while in operation since it is cool to the touch and a special hand grip formed in the case makes it simple.

The portable Vectaire is available in 1500 watt rating for 120 volt operation, either thermostatically controlled or manually operated.

For additional data, ask for item H-809, using the coupon on page 94.

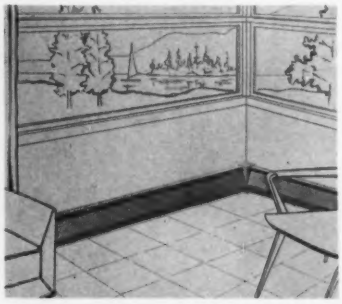
Ceilheat

THE ADDITION of ten models of electric baseboard heaters to the well-known line of wall-insert heaters, portable heaters and electric radiant cable has been announced by Ceilheat, Inc., 5212 Homberg Dr., Knoxville, Tenn.

An outstanding feature of the new baseboard units is the unique baffle arrangement that projects the heated air currents into the room and away from the wall. This design feature makes for cleaner operation and substantially reduces wall streaking.

Automatic acting individual room control thermostats assure custom comfort always. The close tolerance thermostat control is contained in a 9" baseboard section.

The new baseboard heaters are extremely compact in design with a maximum thickness of only 2⅛



inches. The permanent chip and flake proof finish is more attractive than ordinary wooden baseboard and shoe mould. Nutra-shade colors have been chosen to blend with any decor and the heaters may be easily painted to match special room colors.

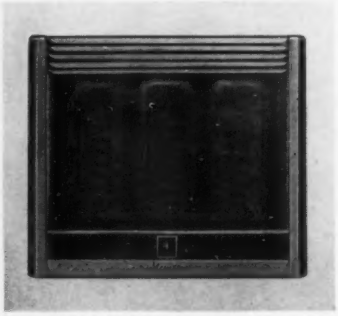
Models are available in 120 volt, 208 volt and 240 volt sizes with capacities from 500 to 2000 watts. This diverse range provides a versatility of selection to accommodate every room.

For additional data, ask for item H-810, using the coupon on page 94.

Martin

A NEW LINE of electric heaters has been recently introduced by the Martin Stamping and Stove Co., Huntsville, Ala.

The wall heater has "Air Guide" louvers at the top of the grille to guide the hot air down, away from the walls into the room and to prevent streaking of the walls. The air



coming out the louvers is secondary heat coming from behind the deflector and therefore, not as hot as the primary heat coming out the grille. This relatively cooler air acts as a buffer for the primary heat which has passed over and by the heating elements and pushes it down into the room away from the wall.

The "Safety Mesh" material used on the wall heaters and portables is something new to the electric heater industry. It is particularly advantageous on the portable heaters since they are used at floor level. The safety aspect of this mesh material is created by an angled opening rather than conventional straight perforations.

Since the opening angle is upward, heat passing through this grille is deflected upward. This eliminates radiant heat on the floor right in front of the unit which might otherwise blister varnish or crack new floors. While the opening in this safety mesh is ample for discharge of heat, the small angled openings provide additional protection against even small prying objects in the hands of children.

Martin's full line of gravity type electric home heaters includes five sizes of portables, five sizes of wall heaters, five sizes of bracket heaters, two sizes of baseboard panels, three sizes of floor furnaces and two models of bath heaters.

For additional data, ask for item H-811, using the coupon on page 94.

Weigand

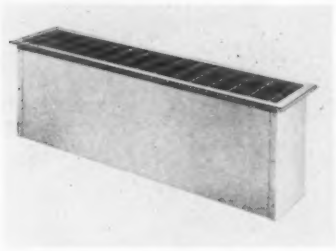
HEATERS designed to supply hidden heat under floor-to-ceiling windows have been introduced by the Edwin L. Weigand Co., 7500 Thomas Blvd., Pittsburgh 8, Pa.

This new type electric heater is mounted between floor joists, below floor level, and is completely out of the way of window glass, furniture or view . . . but still directly under the window to supply thermostatically controlled amounts of heat at the exact points where the heat loss is greatest.

It also provides an excellent warm air curtain at the foot of open stair wells, on the inner side of sun-parlor doors or anywhere heat is needed at floor level and wall space is not available.

Rectangular housings are supplied in two sizes, 30" long for mounting between joists running parallel to windows or for bridging one joist where it runs perpendicular to window and a 14" length for insertion between joists which run perpendicular to window walls. Both housing lengths are 9½" deep by 6" wide and have a top lip which is nailed to subflooring.

Installation is made in slab floor construction through the use of angle-iron corner positioning stakes, which locate and hold the housing while concrete is being poured. A temporary sheet-metal cover prevents concrete from filling heater housing and is later removed for installation



of element and floor grill.

Supplied for 120 or 240 volt a-c installations with outputs of 350 watts (1194 Btu) in the 14" length and 750 watts (2559 Btu) in the 30" length. Normally controlled through individual room thermostat of either line or low voltage types.

Two-stage types are available for activating heaters under windows first with secondary heaters along lower heat loss areas, such as outer walls, on the second stage control. This action tends to equalize room temperature by matching heat input to varying areas of the room's heat losses.

The Wiegand line of electric space heating equipment includes a wide range of other items including baseboard heaters, radiant wall panels, fan type wall insert heaters, radiant wall-type bathroom heaters, utility spot heaters, and radiant heat ceiling cable.

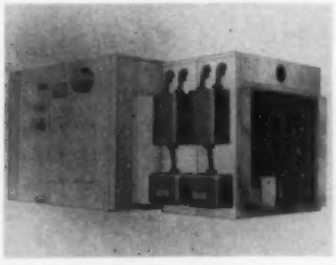
For additional data, ask for item H-812, using the coupon on page 94.

York-Shipley

CLEAN, flameless home heat is combined with summer air-conditioning in the new Magi-Temp heat pump manufactured by York-Shipley, Inc., of York, Pa.

Auxiliary heater sections are controlled by a two-stage thermostat, which cuts in one or both heater sections, and a duct thermostat, which operates when the outdoor temperature falls too low for the heat pump to carry the entire heating load.

The Shipley "Magi-Temp" comes in two sections, to be installed inside and outside the home. The inside section includes motor-driven centrifugal blower, glass-fiber filter, heater section and evaporator coil.



The second section, installed outside, contains the hermetically sealed compressor, centrifugal blower, motor and condenser coil.

The "Magi-Temp" is offered in three models, each equipped with automatic defrosting. In all three sizes, a 30-amp heating coil adds 22,700 Btu, a 60-amp heater 45,400 Btu. These may be used in multiple combinations to supply the auxiliary heating capacity desired for a particular installation.

Model ACR7-20RD has a 2-hp compressor, a cooling capacity of 24,000 Btuh and heating capacity as a straight heat pump ranging from 22,500 Btuh at outside temperature of 60° F down to 12,500 Btuh at 20° F.

Model ACR7-30RD has a 3-hp compressor, a cooling capacity of 33,000 Btuh, and a heating capacity as a straight heat pump ranging from 33,000 Btuh at 60° F down to 18,000 Btuh at 20° F.

Model ACR7-50RD, 5-hp compressor, has a cooling capacity of 62,000 Btuh, and a heating capacity of from 60,000 Btuh at 60° F down to 33,000 Btuh at 20° F outside temperature.

For additional data, ask for item H-813, using the coupon on page 94.

Westinghouse

WELL SUITED to commercial as well as residential applications, the electric baseboard heaters, manufactured by Westinghouse Electric Corp.,

Sunnyvale, Calif., are shown here in a combined barber and beauty shop.

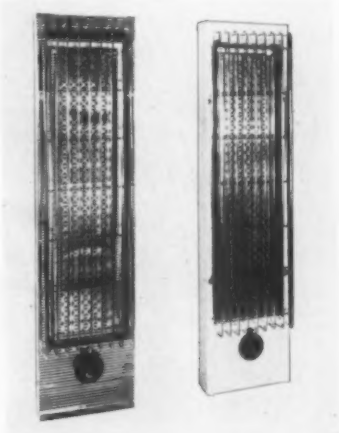
Installed in two-foot sections, as many units are used in each room as engineering specifications require. A control panel is coupled into the heating system of each room, allowing room-by-room use and conservation of heat. The units can be used in a single room or throughout the house. There are no moving parts. The system saves space and construction costs in homes by eliminating the central heating unit, air ducts and radiators.

Wiring required for the baseboard heaters is identical with 240-volt circuits normally used for conventional electric ranges and water heaters. The heaters are adaptable to any decorative plan. Surfaces are of neutral brown hammertone enamel which needs no further finishing, but they can be painted any color desired. Designed primarily for surface mounting, the units can be recessed to mount against studding. Cleaning can be done with a regular vacuum cleaner.

For additional data, ask for item H-814, using the coupon on page 94.

Heatmore

AN ENTIRELY new line of fully automatic, vertical-mounted Ceramic Radiant Heat Panels, in gleaming chrome or oven-baked white enamel steel housings, has been announced



by Heatmore, Inc., 59 Throop Ave., Brooklyn 6, N. Y.

Although specifically designed for supplemental or complete electric heating of bathrooms in either new or existing construction, these slim, attractive Heatmore Panels are also well suited to provide full-length "sun-like" radiant warmth in kitchens, dressing rooms or in virtually any room where wall space is narrow or limited.

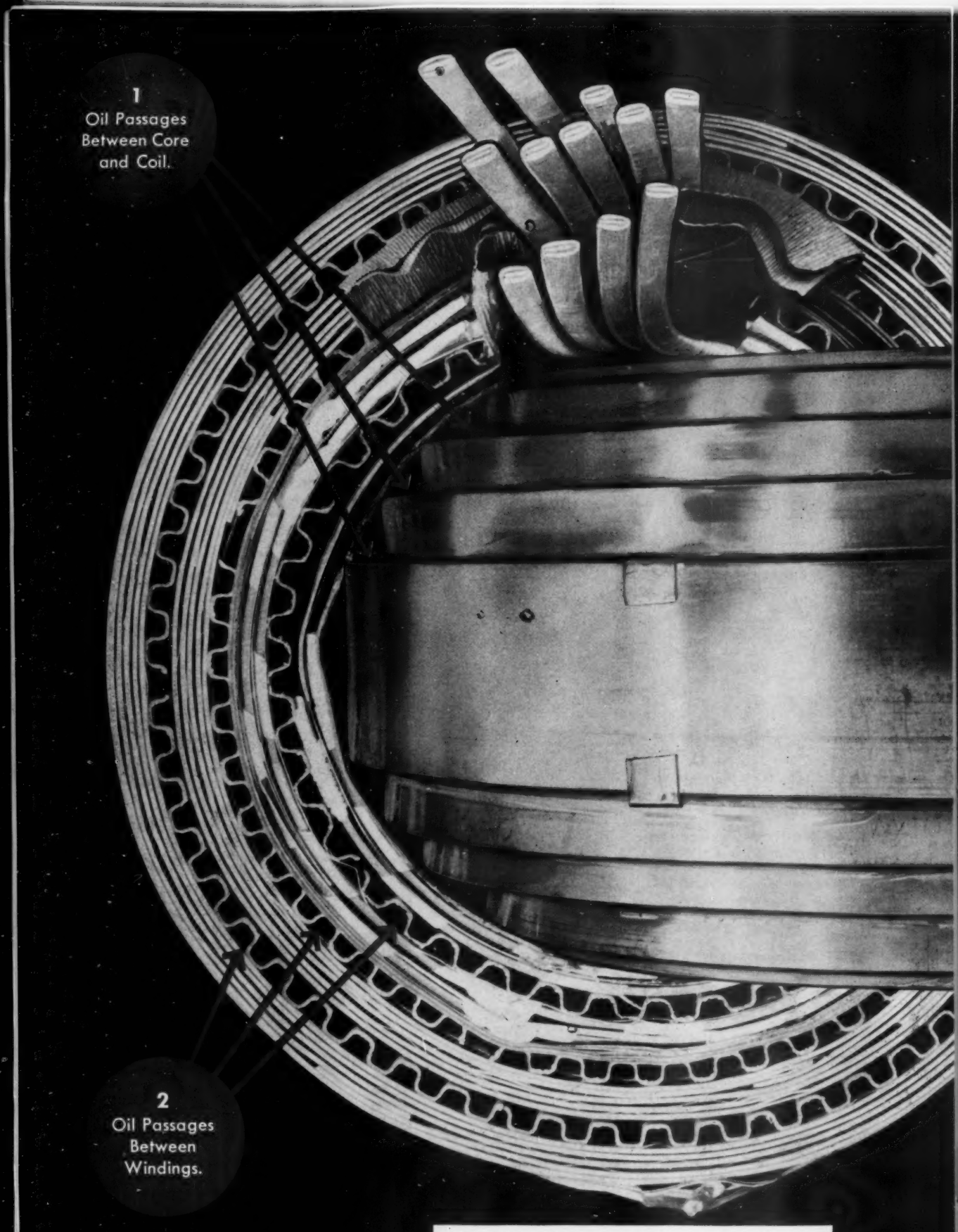
Available in 500-, 750- or 1000-watts, they feature Heatmore's new same size Ceramic panels which because of their compactness and high wattage density provide a radiant heat panel of unusually low cost-per-watt. Surface-mounted units, which are all only 7½" wide, 31½" high and extend 2", are prewired at the factory and require no dismantling for installation.

For additional data, ask for item H-815, using the coupon on page 94.

Titan

NEWEST addition to the line of electric heating devices manufactured by Titan Sales Corp., 109 Seneca

Here's Why



L-M Round-Wound transformers have large, unobstructed areas exposed to cooling oil between core and coil (1), between windings and layers (2), and on the outside of the coil. The result is appreciably lower hot-spot temperature—high short-time overload capacity.

Here's Why

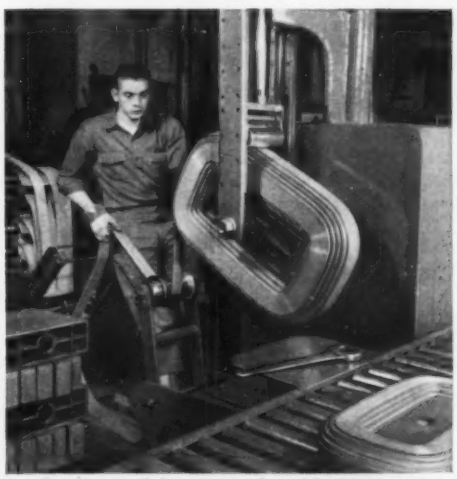
L-M's Round-Wound® Core-Coil Design Gives High Performance

By A. C. WURDACK
Chief Engineer
Large Distribution Transformers
Line Material Industries

L-M's wound-core, round-coil construction provides the most efficient design for obtaining balanced transformer performance characteristics.

Low Losses

The transformer core consists of a tightly wound, continuous strip of high-grade oriented steel. The core is not cut, unwound, or disturbed in any way after annealing. This results, therefore, in low exciting current, low core loss, and high magnetic efficiency.

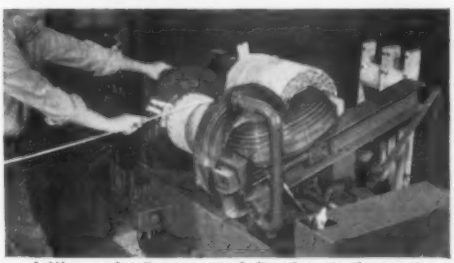


Core is wound from strips of steel having several different widths, resulting in a cruciform cross-sectional area approaching an ideal round shape.

L-M's Round-Wound core permits the effective use of a round coil which has a much smaller perimeter than a coil placed around a rectangular core of the same cross-sectional area. L-M's design, therefore, permits smaller turn diameters, resulting in lower impedance and better regulation at all power factors.

High Short-Time Overload Capacity

L-M's Round-Wound transformers have natural oil passages between the cruciform cross-section core and round coil (1) to provide the greatest possible exposure of coil surface area to cooling oil. In addition, duct spacers placed between windings (2) and between layers in most sizes provide additional oil circulation. L-M's core-coil construction, therefore, provides more efficient dissipation of heat from the coils to the oil. The results are lower hot-spot temperatures, and higher overload capacity, or greater over-all life of the transformer.



L-M's round coils are wound directly onto the uncut core. No malleting is required to shape. Long creepage distance between windings and between leads, gives higher impulse strength.

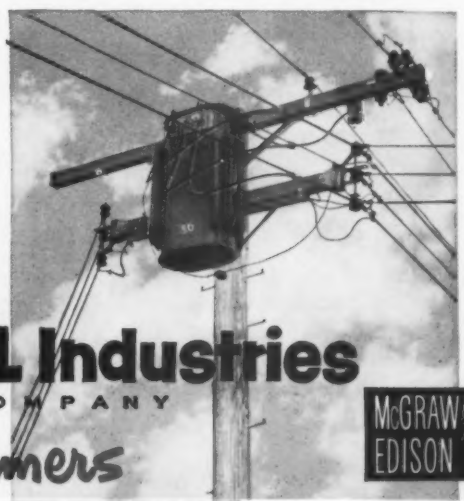
High Short-Circuit Strength

Under short circuits, rectangular coils tend to distort to a round shape, with resultant insulation damage or failure. L-M's round coils are not subject to this distortion when under heavy short-circuit currents, because the coils are already circular in shape. The radial forces are distributed evenly, with little or no effect on the coil. Sturdy clamping structure and varnished coils provide strong mechanical support to prevent axial movement.

Another advantage is L-M's new obround tank design. The transformer is smaller, lighter, and has shorter moment arm distance from the pole.

Get Complete Information

Ask your L-M Field Engineer for complete information on L-M Round-Wound transformers. Or write Line Material Industries, Transformer Division, Zanesville, Ohio.



LM®

LINE MATERIAL Industries

McGRAW-EDISON COMPANY

Transformers

303

McGRAW EDISON

Why CONDULET®

Bldg., Buffalo 10, N. Y., is the HI-V Convertible.

Not a heater, and not a fan, the HI-V Convertible effectively and efficiently does the work of both. Heart of the new Convertible is a powerful rotor-type blower that impels air into the room at high velocity. In winter this jet-stream carries gentle, room penetrating convection heat; in summer, it creates cool, refreshing breezes.

It offers push-button selection of heat and cool air as well as on-off control. In addition, the Convertible features precise, automatic Therm-O-Dial control, Ever Cool Case, modern deluxe styling and rugged construction.

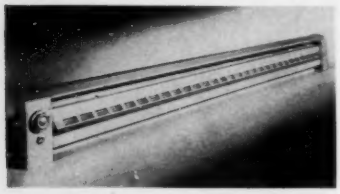
Titan manufactures a complete line of heating units for commercial and residential use, including the Console, Timer Heater, Therm-O-Dial "22", Deluxe Dual-Heater, Famous Standard, and King Size Heater. All Titan heaters are UL approved and offer thermostatic control, pretimer operation, dual heating elements, pushbutton controls, and wide versatility.

For additional data, ask for item H-816, using the coupon on page 94.

Swan

VECTO-RAY electric baseboard heaters are currently being featured by the Swan Manufacturing Co., Vancouver, Washington.

Chief features of the Vecto-Ray line are all-steel one-piece cases, greater heat distribution through the



use of large size aluminum fins and floor deflectors, and completely enclosed heating elements (enclosed in porcelain and metal conduit). According to the manufacturer, two heating elements are used to prevent burn-outs. The low temperature "black heat" produced by the double coils enables them to last indefinitely and the manufacturer maintains that Vecto-Ray heaters never require servicing. In addition to UL approval, the factory offers a 10-year guarantee.

Vecto-Ray baseboard heaters are 2 7/16 in. deep and 7¼ in. high, and range in length from 30 in. to 121 in. Models are available from 500 to 3000 watts. All heaters can be optionally equipped with individual built-in thermostat controls, or made to operate from wall thermostats.

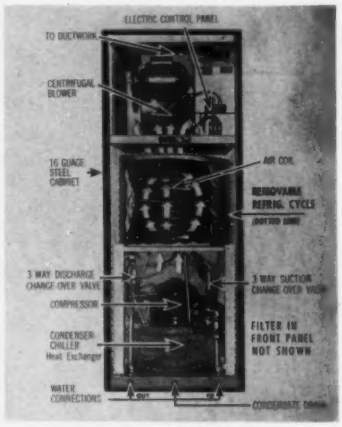
For additional data, ask for item H-817, using the coupon on page 94.

Typhoon

THE PROP-R-TEMP water-to-air heat pump recently introduced by the Typhoon Heat Pump Co., Division of Hupp Corp., Tampa, Fla., is a completely packaged unit, ready to set in place and hook up to water, electricity and ductwork. Models are available in 2½ ton, 3¾ ton, and 6 ton capacity to answer most all residential requirements in any climate.

Important details of the unit are as follows.

Hermetic removable refrigeration cycle includes compressor, both coils and piping: This section carries a 5-year factory warranty, eliminates on-the-job tinkering. Can be exchanged in less than an hour on the job. The unit is serviced at the factory in the



event that is neccssary. No charge for service by the factory under the 5-year warranty.

Copper air coil: This exclusive patented air coil is hourglass shape. It has the inherent quality of producing an even flow of air through it without baffles or deflectors. Note arrows show how air is induced through this coil. It is made up of two pieces, each approximately 55 ft. of continuous finned copper tubing. Produces the effect of a 4-row coil. Tremendously efficient. Over 100 soldered joints are eliminated reducing friction and leakage possibilities to a minimum.

Condenser chiller or heat exchanger. Both the refrigerant and the water pass through this coil. On the heating cycle heat is transferred from the water to the refrigerant. On cooling just the reverse takes place. Admiralty metal is used in this coil which eliminates the problem of corrosion from any element in the water.

Typhoon also manufactures an air-to-air model in 3 and 5 hp capacities, as well as water-to-water packaged units in sizes ranging from 2 to 25 hp, and as water chillers or water heaters alone, as well as heat pumps serving both functions.

For additional data, ask for item H-818, using the coupon on page 94.

Electromode

NEW DEVELOPMENTS in the radiant heating cable line of Electromode, 45 Crouch St., Rochester 3, N. Y., are the addition of 208 volt units to the 240

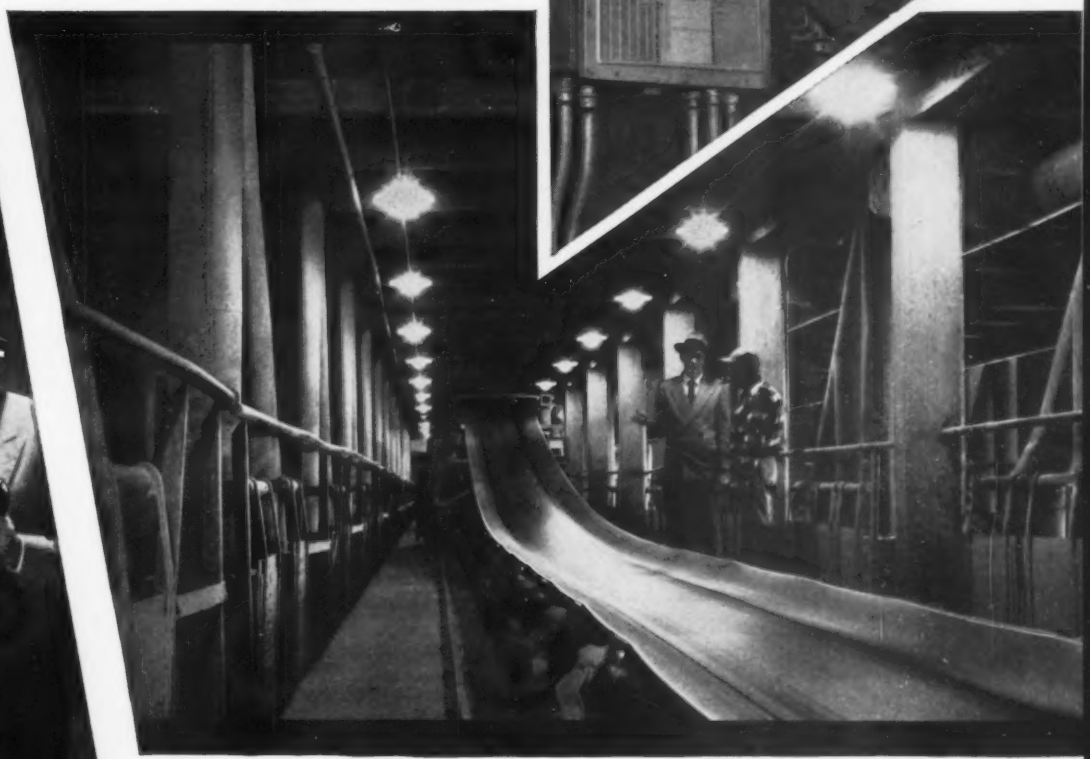
and 120 volt cables already available, and a new Cable Anchor that greatly facilitates heating cable installation.

The Electromode Cable Anchors have been developed to provide a positive spacing, to hold the cable taut, and to prevent damage to the cable while it is being laid.

No special tools or skills are necessary, simply nail the anchors into a pre-set nailing strip (1" x 2") and wind the cable back and forth around the anchors. If no nailing strip has been provided, the anchors can be nailed directly to insulating aggregates or can be secured to hardened concrete using powder or hand driven ram sets and their special nails. The cable remains firmly in place during the pouring of the concrete and is not disturbed by wheelbarrows and workmen's boots.

Electromode has also announced a complete new line of portable electric heaters.

Why CONDULET® Dust-Tight* Electrical Equipment is preferred Everywhere!



Shown here is part of a Crouse-Hinds Condulet Dust-Tight Electrical installation in the Public Grain Elevator, Houston, Texas. Condulet equipment was chosen because:

★ The contractor was experienced with the fine quality of Crouse-Hinds products.

★ The job required a large variety of plugs, receptacles, lighting fixtures, panel boards, switches, junctions, even telephones – all of *safe dust-tight construction* for Class II hazardous locations. *Everything* could be supplied by Crouse-Hinds.

★ Crouse-Hinds field engineers, located in offices right near the job, were ready to help 'round the clock with special problems.

★ Ordering from the Crouse-Hinds catalog was time-saving, simplified, and promised delivery dates were kept.

● There are more than 15,000 items listed in the Crouse-Hinds Condulet Catalog to meet nearly every need in hazardous or ordinary locations. See your nearby Crouse-Hinds distributor or field office.

*t-ignition-proof.

A NATIONWIDE DISTRIBUTION exclusively through ELECTRICAL DISTRIBUTORS

CROUSE-HINDS COMPANY

Main Office and Factory: Syracuse, N. Y.

Offices: Baton Rouge Birmingham Boston Buffalo Chicago Cincinnati Cleveland Corpus Christi Dallas Denver Detroit Houston Indianapolis Kansas City Los Angeles Milwaukee New Orleans New York Philadelphia Pittsburgh Portland, Ore. Salt Lake City St. Louis St. Paul San Francisco Seattle Tulsa Washington RESIDENT REPRESENTATIVES: Albany Atlanta Baltimore Charlotte Chattanooga Jacksonville Reading, Pa. Richmond, Va. Shreveport Crouse-Hinds Company of Canada, Ltd., Toronto, Ont.

The 110 volt models are available in 1320 or 1650 watts, manual or with built-in thermostat. The two-tone colors are designed to blend with any

decor and are Driftwood (gray and ivory) or Desert Sand (beige and tan).

The 240 volt heaters were designed to offer a compact safe heater in 2400, 3200, or 4800 watts. These models are all equipped with a heavy duty, hydraulic type thermostat and are available in two-tone Driftwood color.

In both of these heaters the Electromode exclusive cast aluminum safety grid is used, eliminating danger of fire, shock or burn. All Electromode heaters are baby safe. Each heater has a safety switch built right onto the heater element so that even if a blanket is dropped over the heater, it will shut off before it gets dangerously hot.

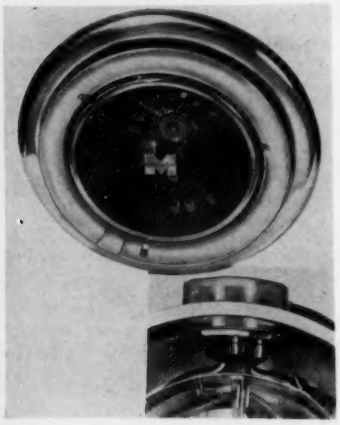
These heaters are available now through the electrical trade channels that now sell the 150 or more other models of Electromode heaters designed to do a complete heating job for homes, farms, industry or schools.

For additional data, ask for item H-819, using the coupon on page 94.

Mission

AN IMPROVED overhead light and heater combination is now offered by the Mission Appliance Corp., 12611 Crenshaw Blvd., Hawthorne, Calif.

The plug-in assembly eliminates awkward overhead wiring-in during



"finish." Unit is completely wired at the factory. Model OHL, with fluorescent lamp, is illustrated; heater alone (Model OH), is available at lower cost.

Handsome grille design is another new feature. Improvements in wiring and appearance have not increased selling price, the manufacturer emphasizes.

A six-inch fan in either model operates in conjunction with 1500-watt heating element, to direct heat down from the ceiling and circulate it evenly throughout the room.

For additional data, ask for item H-820, using the coupon on pgae 94.

Markel-LaSalle

A completely new line of heating products are being manufactured by Markel Electric Products Inc., and LaSalle Products, Inc., both at 145 Seneca St., Buffalo 3, N. Y.

Ceiling radiant Heetaires contain a completely sheathed element and include plug-in installation. The series "280" is rated from 1000 to 1250 watts.

Heavy duty wall-insert and wall-attachable fan-forced Heetaires have elements guaranteed for five years against burn-out. Ratings for the Series H 270 are from 2000 to 5000 watts.

The series 240, radiant wall-insert Heetaires are rated from 1000 to 1500 watts. Both automatic and manual models are available.

Heetaires are listed by Underwriters' Laboratories, Inc.

For additional data, ask for item H-821, using the coupon on page 94.

Electric heating

(Continued from page 27)

fices to say that a 40 ton air conditioning unit was selected.

The dimensions, structural material and heat losses of this building are listed as follows: width, 112 ft., length, 129 ft., ceiling height, 12 ft., total area, 14,448 sq. ft. Approximate area to be heated was 11,150 sq. ft. Approximate volume to be heated, 133,800 cu. ft. Construction features included 12-inch solid masonry walls, acoustical tile ceiling with 4 inches of rock wool insulation, and a concrete slab floor covered with asphalt tile.

The total heat loss was calculated at 450,000 Btuh. Deducting other contributing factors such as heat from lamps, etc., of 150,000 Btuh, the net heat loss was calculated at 300,000 Btuh.

From this data the following equipment was selected and installed: 96 kw of electric resistant heat comprised of two forty-eight kw blast coils designed to operate in two 24 kw stages set at a variation of temperature of 1½ degrees.

The staging of 24 kw offers better humidity control during moderate winter weather and is also highly desirable on the part of the Georgia Power Company from a load standpoint.

It is interesting to note that the two 3 hp blower type fans installed with the summer air conditioning unit are utilized as the warm air handling equipment during the heating season. The heating units and fans are located in two ducts that parallel each sidewall of the building to provide proper warm and cool air distribution.

In addition to the heating and cooling load there is an installed capacity of 57 kw of lighting, 60 horsepower of refrigeration and miscellaneous power, and 30 kw of heating elements exclusive of space heating; resulting in a total connected electrical load of 265 kw. These electrical requirements are served through an 800 ampere, three phase 120/208 volt circuit breaker.

Due to the provision of section "B" of our General Service "B-10" rate, this customer receives his total electric service through one meter. Therefore, it is necessary to estimate the consumption and cost of electricity used for heating this building for the past heating season. This estimate is based on an earned rate of 1¢ per kwh made possible by our counted demand rate. The accompanying table shows billing data for the past heating season and how heating costs were determined.

As shown in the table, kilowatt-hours for space heating during the 1956-57 heating season totaled 52,-150, which at 1¢/kwh cost $521.50. The resulting unit cost of heating was 4.7¢ per square foot which compares favorably with the costs of heating using combustible type fuels.

In conclusion let us point out that the Georgia Power Company readily recognizes the importance of electric heating as a major load building factor. Its staff of sales engineers are constantly carrying the story of electric heat to the people of Georgia. This is more than evident by the continuing growth of all-electric customers throughout Georgia. The cleanliness, low maintenance, complete automation, and economy of electric heating makes our job of promoting this heating an easier one.

RESIDENT REPRESENTATIVES: Albany Atlanta Baltimore Charlotte Chattanooga Jacksonville Reading, Pa. Richmond, Va. Shreveport Crouse-Hinds Company of Canada, Ltd., Toronto, Ont.

PREFORMED ARMOR-GRIP SUSPENSION UNITS provide a

Pretty Soft Life for a Conductor

. . . cradled in durable neoprene

No vibration fatigue here. The Preformed Armor-Grip Suspension Unit (AGSU) eliminates failure by eliminating stress concentration.

The conductor is cushioned in a split neoprene core, held securely by Preformed rods that never lose their tight grip, and supported in an aluminum housing. Conductor is protected and longitudinal stresses are distributed through the entire length of the rods—not at one point.

Like other Preformed line accessories, the AGSU obsoletes bolted hardware. It's easier to apply (no tools needed), costs less, does a better job. You get mechanical strength and electrical protection, and—because of the smooth contour and large diameter of the rod ends—corona emission and radio influence are minimized.

Want to know more about the Preformed Armor-Grip Suspension Unit—or see the application demonstrated? Write PREFORMED LINE PRODUCTS COMPANY, 5349 St. Clair Avenue, Cleveland 3, Ohio. Cable Address: Preformed-Cleveland . . . in 10 years the leading manufacturer of armor rods, dead ends, Guy-Grip dead-ends and other line accessories.

PLP

You can look up to Preformed

Made in accordance with or for use under one or more of the following U. S. Patents: 2,722,393; 2,275,019; 2,587,521; 2,609,653; 2,691,865; other patents pending.

Contractors tell how

Building project record facilitates wiring jobs

By Pete J. Collis
Contractor
Collis Electric Co.
Washington, D. C.

◆ WE HAVE DEVISED a plan, traced on white paper, whereby we know exactly how much work has been completed in a housing project, and at precisely what point our men are working. It saves us time and inconvenience locating them on a job, as well as letting us know our progress per unit. We can learn from this plan whether we are proceeding at the proper pace and when final inspections have been completed.

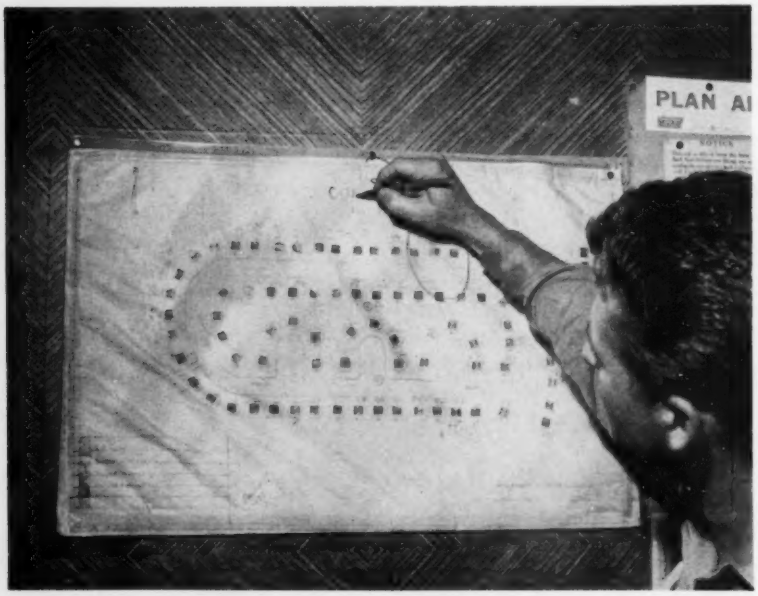
On the plan of a large housing project, each house, or unit, is represented by a square. The square is divided into four triangles with an "X" across the middle. When the first floor is roughed in, the top triangle is filled with red crayon. When the basement is roughed in, the bottom triangle is filled in with red crayon. Upon completing the switching and plugging of the entire house, and installing all devices, the right triangle is filled-in with blue. And when the house is ready for inspection after the kitchen and other equipment is in, the left triangle is filled-in with blue.

We indicate completion with date at the top of the square, followed by an "F" with date when final inspection was completed.

The plan is located in the office. It is the job of the journeyman in charge of a crew to fill in the triangles whenever he returns each evening. Only completed jobs are filled in.

The plan has saved us many precious minutes hunting around a project for our men, and saved our dispositions and health in bad weather when there would have been mud and gullies to tramp through.

It is a simple device, taking little time, and, when accurately kept, can be of great help and value.



From day-to-day, this lay-out on white tracing paper tells Electrical Contractor Pete J. Collis, Collis Electric Co., Washington, D. C., how his wiring contract in this large housing project is progressing.

Simple daily record speeds job progress

By Hall McLaughlin
Owner
Columbia Electric Co.
Columbia, Mo.

◆ WE LIKE our system of keeping what might be called a perpetual inventory of jobs because it keeps us right on top of trouble if any develops. This system gives us vital information on profits and progress at once instead of weeks afterward and in time so we can take advantage of the information.

This system consists of having each journeyman write a record of his day's work in an ordinary notebook at the end of each day. We allow them enough time so they get paid for the time used in making this record. Some of our new employees do not like the idea when they first come to work for us, but when they get used to it, they are willing to cooperate.

We use an ordinary note book and so require no printed forms

and the books are filed away and has a tendency to get action when what we have lost to irresponsible

BEST

NEW SET SCREW FITTING FOR EMT

A COMPLETELY NEW EFCOR PRODUCT!

- STAKED-IN screw never falls out.
- FREE-RIDING screw never freezes.
- DEEP-SLOTTED screw keeps screwdriver from slipping.
- TIGHTER-GRIPPING twin-bite cup-shaped screwpoint.
- UL approved – concrete tight.

ADVANCED ENGINEERING FEATURES!

- MADE OF TUBING – one-piece, heavy-wall construction.
- HEX SHOULDER provides holding surface for wrench or plier installation.
- See your Electrical Wholesaler – **write for free sample and folder.**

FOR THE NEWEST TOP QUALITY LINE OF SET SCREW FITTINGS

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ELECTRICAL FITTINGS CORPORATION • 37-50 57th STREET, WOODSIDE 77, NEW YORK

and the books are filed away and dated.

Each journeyman must report what he has done and what material he has used. Thus we know exactly how much labor and how much material we have in every job.

We probably reap a hidden dividend, too, from the fact that each workman takes pride in his work and knowing that reports are made by each one, it has a tendency to reduce nonproductive time. It also has a tendency to get action when a job bogs down for lack of a part or because of lack of cooperation in the office or with another workman, because no one likes to report that he spent a certain number of hours or minutes waiting.

This procedure is required on every job whether it is a contract job or a service call.

After using it for several years we wouldn't be without this method which we have developed from our own experience.

Legal advice can eliminate loss from "shady deals"

By Ponder Baccus
Electrical Contractor
St. Petersburg, Fla.

◆ IT COMES AS NO surprise to electrical contractors that the emasculated Mechanic's Lien law may result in losses, where wiring has been performed for a general contractor who either slows up the job for personal reasons, collects a substantial draw from the owner and doesn't pay his sub-contractors, or simply collects a sizable sum and then "takes to the hills."

Southern contractors need to be alert to the fact that the most fertile field for the larcenous general contractor is in cities where building is booming. Seldom are shady building contractors found in towns not yet hit by a boom. In cities bursting at seams with building activity, the contractor with evil intent flourishes like the proverbial green bay tree. The electrical contractor who undertakes work for a contractor about whose past performance record he knows little, needs to find ways and means of obtaining assurance that he will be paid for his time and materials.

We have discovered two most satisfactory methods of making certain that we will get paid for our work. First, we negotiate with the owner, and not the general contractor, to determine who will pay whom and when. We don't spare the general contractor's feelings in this respect. Naturally, each electrical contractor has done work for general contractors who are the soul of honor and reliability, and whose word is truly their bond. In such cases, no stringent safeguards may be necessary.

But once in a while, the electrical man may find himself bidding a job of an unknown general contractor who may also be most honorable; but even so, for the first few dealings, it pays to be prepared.

Loopholes in law

We have found too many loopholes in the Mechanic's Lien law to consider it as any iron-clad source of protection for us. For example, in the case of a derelict general contractor, the 20 per cent withholding proviso may mean very little to us when a plumbing bill may be so high as to snag the major portion of such disbursement.

For this reason, we have engaged an attorney on retainer basis. For a modest fee, we can call him at anytime for advice on preparation of a contract, or on its method and manner of payment, or make arrangements for all payments both to the general contractor and to us be made in his office, on checks signed by the owner and made payable to us, as well as the general contractor. Thus, the endorsement safeguards the owner from possible double payment, and assures us our money.

It has been a mistake for us not to have earlier employed a consulting attorney. Certainly his fee is very little in comparison with what we have lost to irresponsible general contractors, and we consider his advice the best insurance against trickery and knavery from these light-fingered folk.

Anytime a job looks shaky, we call our attorney for advice, figuring we may as well pay him a little rather than lose a lot.

Lending agencies, too, can make you come a cropper. We had satisfactory dealings with one financial institution, which was in process of selling a house to a prospective buyer. Before the buyer paid for it, the house was moved to a lot owned by the buyer. The lot had been examined by the lending company, which committed a loan on it, and the loan commitment was verified to us.

We bid successfully on wiring the building, and the loaner reserved the amount of the bid for us. However, the house was too big for the new lot, and in the subsequent hassle, the original owner foreclosed, since the new owner couldn't buy the extra lot that would have permitted the house to remain on the new site.

The loan company washed their hands of the deal; the housemover lost $1,400; the plumber and septic tank installer lost; and so did we, having let the 90-day grace period lapse.

A single phone call to a lawyer would have saved us money and a big headache. An attorney is certainly cheap insurance for the electrical contractor!

Now we notify our lawyer before starting a job, and not later than one week before the last bit of work is done.

Another thing we've learned is to get acquainted with the banker in a new town where you're going to bid on work. He can give you lowdown on shysters, as well as on general contractors of unblemished reputation.

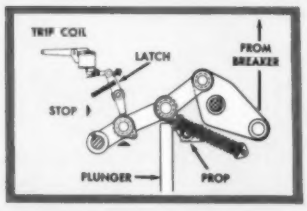
Check with other trades

We also solicit reports from allied businessmen, like the concrete products suppliers and tradesmen in various crafts. These people are a prolific and valuable source of information on the credit standings of the general contractors who deal with them. Such information guides us in estimating if a general contractor is a good risk. At other times, this inside 'dope' may help us decide not to stick our necks out.

In return for their cooperation, we are now contributing to a fund

(Continued on page 110)

Mechanically trip-free operation of this Pneu-Draulic operated breaker means positive protection



Since 1933—

Allis-Chalmers has built all power breakers mechanically trip-free. Only in mechanically trip-free breakers are contacts and closing mechanism completely uncoupled during tripping operation . . . enabling contacts to open at full rated speed without restriction from mechanism.

Breakers that are only pneumatically or hydraulically trip-free can't give you this protection.

Pneu-Draulic is an Allis-Chalmers trademark.

For details of this and other features of Allis-Chalmers power oil circuit breakers, call your nearby A-C office, or write to Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wis.

A-5241

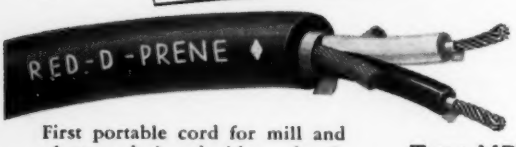
ALLIS-CHALMERS

Diamond "Red D"

WIRE and CABLE

YOU KNOW THEM, YOUR CUSTOMERS KNOW THEM AS QUALITY PRODUCTS

Accepted as one of the best in the industry, Diamond Wire products have earned this reputation through a continuing program of production control, research and product development. Your order on any Diamond product triggers immediate action . . . maximum service to you.



First portable cord for mill and plant use designed with tough, oil-resistant Type MD* neoprene sheath in Industrial Red for ready Identification. *(Mill Duty).

Type MD® (Mill Duty) RED-D-Prene®

Thermoplastic insulated and jacketed non-metallic sheathed cable. Retards flame and has excellent resistance to moisture, corrosion, fungus, abrasion. Listed by UL.

Diamond DUF* Type UF

Non-sticking, smooth and easy to pull, Diamond DTX will not flake off. Moisture and flame resistant, it is clean to handle and strips easy.

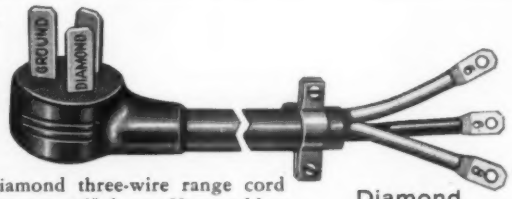
Diamond DTX® Non-Metallic White Sheathed Cable

Flexible steel armored cable ideally suited for general lighting and wiring in non-fireproof homes. Available in two, three and four conductor.

Diamond ABC Armored Bushed Cable

May be used without conduit from pole to building and down side of building in places not subject to mechanical injury. Listed by Underwriters' Laboratory.

Type SE Service Entrance Cable (Armored and Unarmored)



Diamond three-wire range cord sets are 36" long. Have rubber molded cap, molded on rubber jacketed cable—are complete with steel strain relief. UL approved.

Diamond Range Cord Set

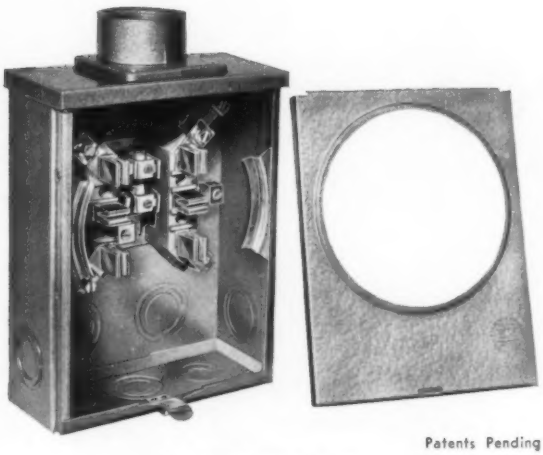
Trade Mark ®

DIAMOND

WIRE and **CABLE** Company

Sycamore, Illinois

WAREHOUSE: BIRMINGHAM, ALABAMA



Patents Pending

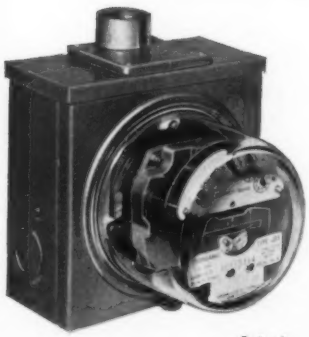
CATALOG-WVL-0175A-2"
SIZE 10½" x 8" x 3⅝"
175 Ampere Capacity
3-Gang Ground, 5th and 6th Terminals
Added Line Terminals for connection to other sockets

listen

. . . to what they
are saying . . .

QUALITY WITHOUT QUESTION
REVOLUTIONARY – UNIQUE
FULLY TESTED & THOROUGHLY TRIED

ENGINEERED TO PROVIDE ALL THE ADVANTAGES YOU WANT AND NEED



Patents Pending

CATALOG-WV-011-A-1¼"
Size 8" x 8" x 3⅝"
Up to 100 Amp. Capacity

Positive corrosion protection . . . the complete enclosure is provided with a nonabsorptive oxide film after fabrication, then finished in a hard, durable, baked-on grey Hammertone Enamel . . . unexcelled performance!

B & C's

RINGLESS
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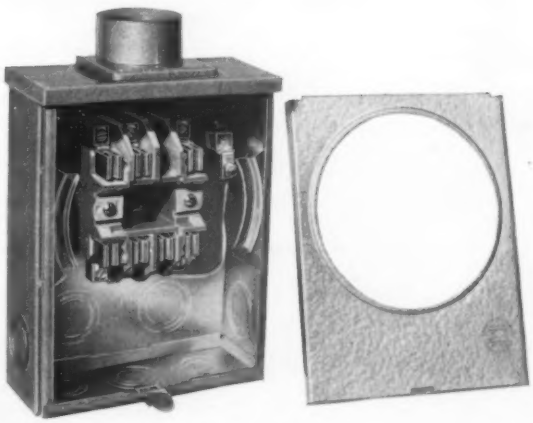
SOCKETS

. . . available in . . .

Light Duty
Medium Duty
Heavy Duty

Patents Pending

CATALOG WVL-0150A-2"
Size 10½" x 8" x 3⅝"
Up to 150 Amp. Capacity



Patents Pending

CATALOG WVL-1007-A-2"
Size 10½" x 8" x 3⅝"
7-Terminals — 100 Amp. Capacity

No Sealing Ring required! New Snap Latch sealing device. Interchangeable conduit hubs, and many additional flexible features. Stainless steel sealing latch and stainless rivets eliminates electrolytic deposits. Unique hinge terminals, pressure plate design, 4/0 capacity—straight-thru single or 3 gang terminals—5th and 6th terminals—semi-automatic visible by-pass—and many other features. . . .

Write for descriptive catalog containing installation data and current price list.

B and C

Your Seal of Dependability and Safety

METAL STAMPING COMPANY

590 MEANS ST., N. W. • ATLANTA, GEORGIA

CLASS 200 TYPE MK for More Housepower

50 AMP.

30 AMP.

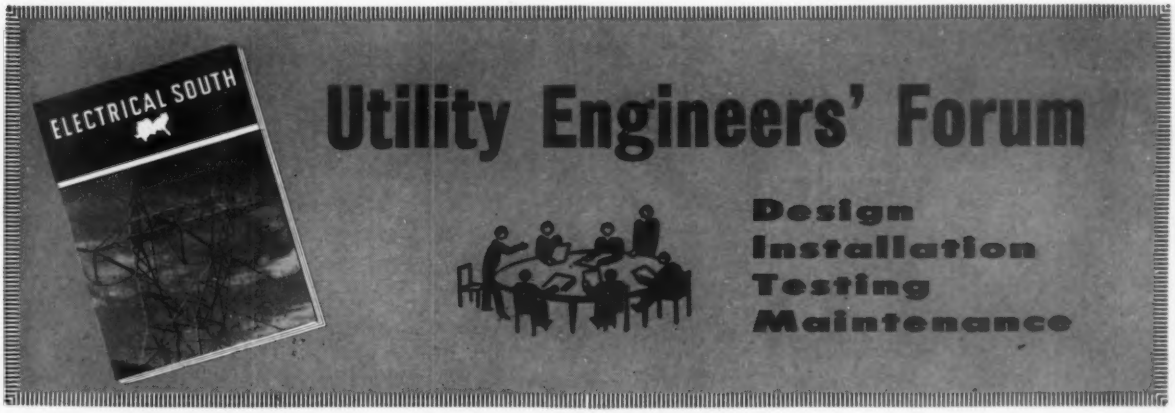
Note the excellent load curves provided by Duncan's relatively low speed Class 200 meters.

The Duncan Type MK Class 200 meter is the latest of the improved singlephase MK line, built to accurately meter a wide range of loads from a few watts to the meter's full 200 ampere capacity. Arc-resistant insulation in the electromagnet, self-contained arc gaps to by-pass electrical disturbances, and Alnico V permanent magnets to maintain calibration stability are just a few of the MK features in this meter.

Duncan pioneered the Class 200 rating with the Type MF-SE meter introduced eight years ago. This new MK offers improved performance, *plus* all of the features of the Duncan MK singlephase line. Both the 30 ampere and 50 ampere Duncan Type meters have a K_h of 12 and run at the same speed per ampere. A minimum light load safety factor of 2% is provided to avoid creep. Average starting watts is 1/3 of 1% of rated load.

LIVE BETTER ELECTRICALLY WITH FULL HOUSEPOWER

DUNCAN ELECTRIC CO., INC., LAFAYETTE, INDIANA



New supervisory control system performs 1000 remote functions

◆ DEVELOPMENT of a supervisory control system that allows more than 1000 different codes to be transmitted over a single two-way channel has been disclosed by Hupp Electronics Company, a division of Hupp Corporation.

In announcing the development at the recent Institute of Radio Engineers Exposition, John J. McEnerney, president of Hupp Electronics, pointed out the new system will control and continuously supervise hundreds of functions at remote locations. Previous systems did not have the capacity and flexibility of the new equipment, which also is capable of alternate use with teletype, he stated.

"This system is particularly suited for control of pipe lines, power stations, railroad switches and in similar applications where operators at one or more locations can control equipment at distant points and get positive identification that each job is done," said Mr. McEnerney. "It will do far more than previous equipment, yet represents a simplification of components, is substantially smaller in size, has lower power requirements and costs less."

The ERX (electronic remote switching) units operate on any communication facility acceptable to standard teletype transmission —a direct current teletype circuit or a telephone circuit with adapter unit, for example. It does not respond to signals of the communication traffic. Directions can be given simultaneously for transmission over a single two-way channel and they will be performed sequentially. Signalling time ranges from 0.8 seconds to about 2.0 seconds.

Operating sequence

A principal feature of the system is that whenever a change of a remote function occurs, a code signal is transmitted to the control center where it sounds an alarm and lights a "disagree" lamp. Should one or more functions at remote locations change simultaneously, the code signals are sent sequentially, with no interference or loss of information.

When a control signal is received at the remote location, a noncoded answer-back signal is returned to the control center. After the function is actually performed—which might be minutes later as in the case of closing a valve—a coded answer-back signal

(Continued on page 70)

John J. McEnerney, (left), president of Hupp Electronics, explains how new supervisory control system can allow more than 1,000 different control signals to be transmitted over a single two-way channel.

Magnetic lightning arrester utilizes spinning arcs

◆ A SMALL DOUGHNUT-SHAPED ceramic magnet developed by Westinghouse Electric Corporation is making life miserable for arcs in lightning arresters. The magnet, placed mechanically "in series" with the gap surface, provides a constant magnetic field in the gap. When the arc is drawn, it is at right angles to the magnetic field, and therefore spins like the armature winding of an electric motor.

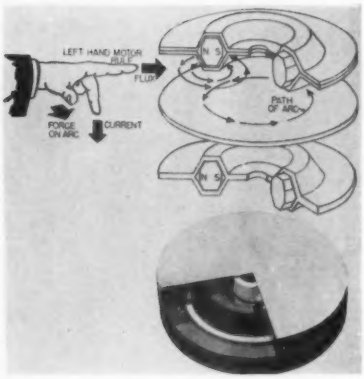
Previously, the arc tended to stay in one spot. With discharges of relatively long duration, such as switching surges, there could be pitting at these spots on the electrode surfaces. This could eventually change the arrester spark over.

When the arc spins and moves, pitting cannot occur, so gap life is lengthened. Also, the ability of the gap to interrupt power-follow current is improved.

Since the arc must spin, critical electrode spacing has been simplified, by placing a small pimple on one surface; only this pimple spacing is critical. Once the arc is drawn, the magnetic field drags it off the pimple, and around the gap, which aids arc interruption.

The ceramic magnet is made of barium ferrite, which, electrically, is an insulator. However, its magnetic life is virtually infinite. The magnet is enclosed in a brass shield so that the discharge currents go around the outside of the

(Continued on page 110)



Note the doughnut-shaped ceramic magnet in the above cutaway view of the new Westinghouse Mobilarc gap for lightning arresters, which, as indicated in the diagram, spins the arc.

Multi-stator network meters first in new polyphase line

◆ DEVELOPMENT of a complete new line of polyphase watthour meters has been undertaken by Sangamo Electric Co., of Springfield, Ill., with the Type P2S network meter as the initial unit. These socket type two-stator meters will have improved electrical and mechanical characteristics and extended load range resulting from the use of a slow full-load speed of 8⅓ rpm. A reduction in height will permit the use of the single-phase cover that has been an industry standard for 20 years.

Accurate load registration, without special calibration, is provided for circuit variations from 42% to 125% of rated voltage. This operating range will permit the use of 240 P2 meters on 120/208, 240/416, and 277/480 network systems.

The P2 watthour meter will start at ¼ of 1% of rated load and can be operated continuously at 666-2/3% of rated load with a maximum temperature rise of 50°C., the manufacturer reports.

Other design features are: ease of assembly, quick accessible adjustments, (three adjusting screws furnish adequate full load, light load and balance adjustments), good inherent accuracy, stable calibration and improved disk and name plate visibility.

Sangamo executives check first production run of new Type P2S network meter, first of a complete new polyphase line. Left to right, James H. Patton, vice-president and manager of power equipment sales; Fred R. Kurz, assistant chief engineer; Robert R. Wylie, marketing manager; and Hugh W. Griffith, watthour meter sales manager.

YOUNGSTOWN "BUCKEYE" CONDUIT

. . . protects wiring system of Cleveland's new $5 million air terminal

Highly functional—yet strikingly impressive, describes the new Terminal Building at Cleveland's Hopkins Airport. It's part of an $8 million improvement program that will restore Cleveland's position of national prominence in the air transportation industry.

Planners of the airport's revitalization project wisely specified Youngstown's "Buckeye" Full-Weight Rigid Steel Conduit for life-time protection of the Terminal's all-important electrical wiring system. Electrical systems that fail to function properly are definitely a bad investment.

To keep your electrical systems functioning properly, specify quality-controlled Youngstown "Buckeye" Conduit. Satisfied users tell us, "It's easier to bend and thread — easier and faster to fish wires through, and due to its superior corrosion-resistance, gives a much longer, trouble-free service life."

"Buckeye" Conduit is the specification of many leading building owners, architects and contractors—why not make it yours, now?

Leading distributors in the industrial and electrical markets carry complete and ample stocks for on-the-spot delivery to your job sites. They're awaiting your phone call—today.

Cleveland Hopkins Airport; Cleveland, Ohio
Architects: Outcalt, Guenther & Associates, Cleveland, Ohio
Electrical Contractor: Polacek Electric Co., Cleveland, Ohio
Conduit Supplier: Westinghouse Electric Supply Co., Cleveland, Ohio

THE YOUNGSTOWN SHEET AND TUBE COMPANY
Manufacturers of Carbon, Alloy and Yoloy Steel
General Offices - Youngstown 1, Ohio
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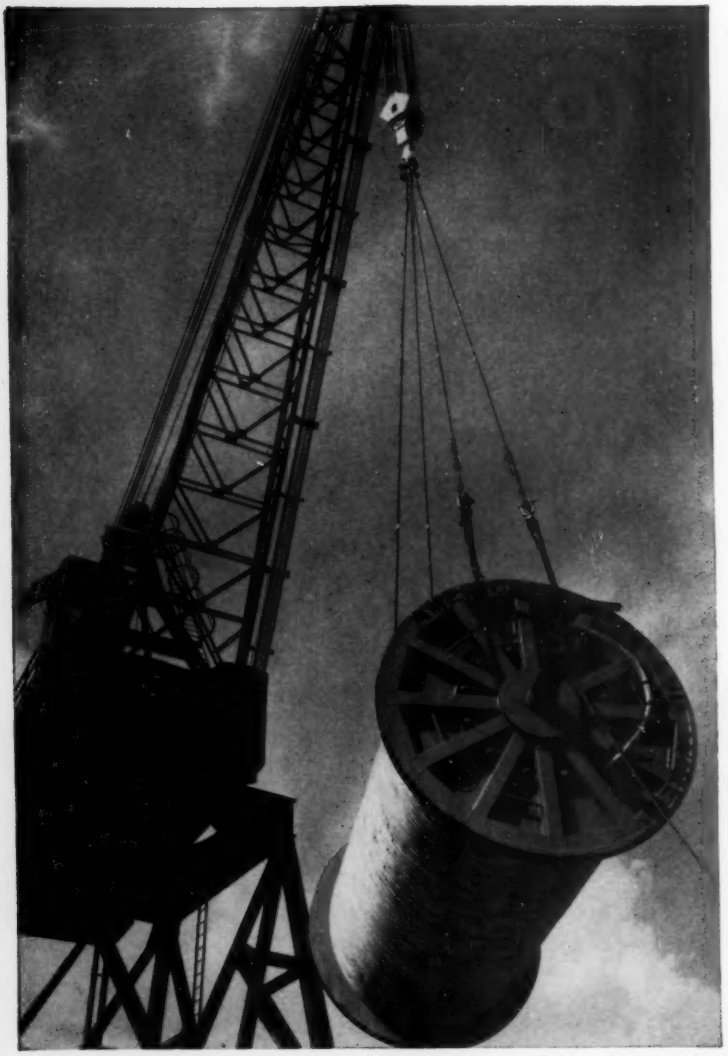
Standard-threaded rigid steel conduit is the only wiring system approved today by the National Electrical Code as moisture-, vapor-, dust- and explosion-proof for use in hazardous locations and occupancies.

Cable laying



Bath Iron Works' crane loads reel from flatcar to barge.

LOCAL NEWSPAPERS seldom get excited over the laying of a submarine cable. But when Central Maine Power Company announced plans to link the island of Islesboro with a new 12,000-volt underwater cable, newspapers throughout the state covered the event.

The new cable, three inches in diameter and 2.3 miles long, was made in one length with no splices permitted. The cable, reel and cradle weighed *63 tons*, and in the whole area north of Boston there was only

CMP officials check final armoring of cable at mill.

71-year-old "Seguin" stands by ready to help.

CMP crew boards launch during the pre-dawn hours.

makes headlines in Maine

one water-front crane (owned by Bath Iron Works) big enough to load the reel onto its barge. Even the tugboat was newsworthy; it was the venerable "Seguin," one of the oldest tugs on the coast, built in Bath 71 years ago.

The actual cable laying was directed by Al Young, CMP's Eastern Division line superintendent. Under radio control, the barge started off at daybreak to lay the cable in the 220-foot-deep (maximum) water. The laying took only three hours, and the barge reached the far shore at high tide (as calculated), so it could get close to the shore.

The Tiger Brand cable was made up of three No. 2 conductors covered with conducting fabric tape, $^{21}/_{64}$ inch of marine rubber insulation, color-coded fabric conducting tape again, then a tinned copper tape that furnishes additional shielding and also protects against the toredo or "ship worm." Saturated jute fillers and a binder of rubber-filled tape complete the core.

Two layers of asphalt-saturated jute are spirally applied in opposite directions, followed by the all-important No. 6 galvanized steel armor wires. A final asphalt coating is applied, then a layer of chalk to prevent sticking.

• • •

If you'd like more information about submarine or any other kind of high quality Tiger Brand cable, just call your American Steel & Wire salesman.

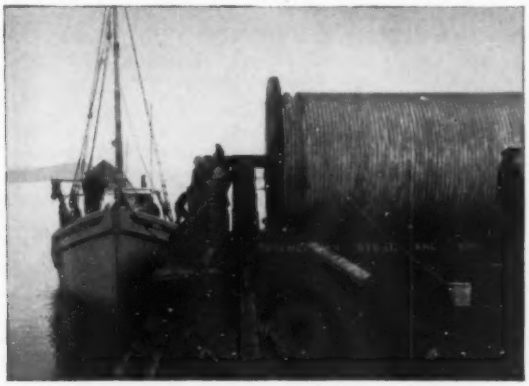
AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS TIGER BRAND ELECTRICAL WIRE & CABLE

A STANDARD TIGER BRAND CABLE FOR EVERY SPECIAL JOB

- asbestos wire and cable
- mold cured portable cord
- shovel & dredge cable
- paper & lead cable
- varnished cambric cable
- interlocked armor cable
- special purpose wire & cable
- aerial, underground and submarine cable

UNITED STATES STEEL



Trawler maneuvers barge with reel into position.

End of the line. Cable is trenched, potheads are on pole.

Line structure setting rig

Faced with the task of setting 658 line structures of 85 and 100 foot heights, Georgia Power developed a special rig utilizing a 60-foot boom.

By R. E. Rutherford
Georgia Power Company
Atlanta, Georgia

◆ When the Georgia Power Company set out to build its first 230-kv transmission line, from Plant Yates near Newnan, Ga., to Bonaire, 102 miles to the southeast, one of the first tasks of the company's operating department was that of devising a new method — and mechanism — to set the extra length poles necessitated by a 230-kv system.

The 102-mile stretch involved 658 structures, all but 10 of them of the wooden pole type. The wooden poles in some areas were as high as 85 feet. The 10 other structures were of the tubular steel type, and several of these were as high as 100 feet.

The two structure-setting rigs which the company had been using in building its 110-kv lines were of insufficient height and capacity to handle the larger structures. These rigs used a boom mounted on a specially - designed rubber - tired trailer, which was attached by a rigid tongue to the crawler tractor furnishing the power.

Joe Cox, general foreman in the company's special line construction department, conceived the idea of a rig involving a boom with a maximum length of 60 feet and mounted on the rear of the tractor itself. R. E. Donnelly, of the Automotive Section, was project engineer on the job; and Ben Hawkins, of the company's Davis Street repair shop, built the rig.

An International Harvester TD-18 tractor was chosen to support the rig. The tractor was equipped with a 12-foot angle bulldozer blade and 22 inch tracks, the widest available.

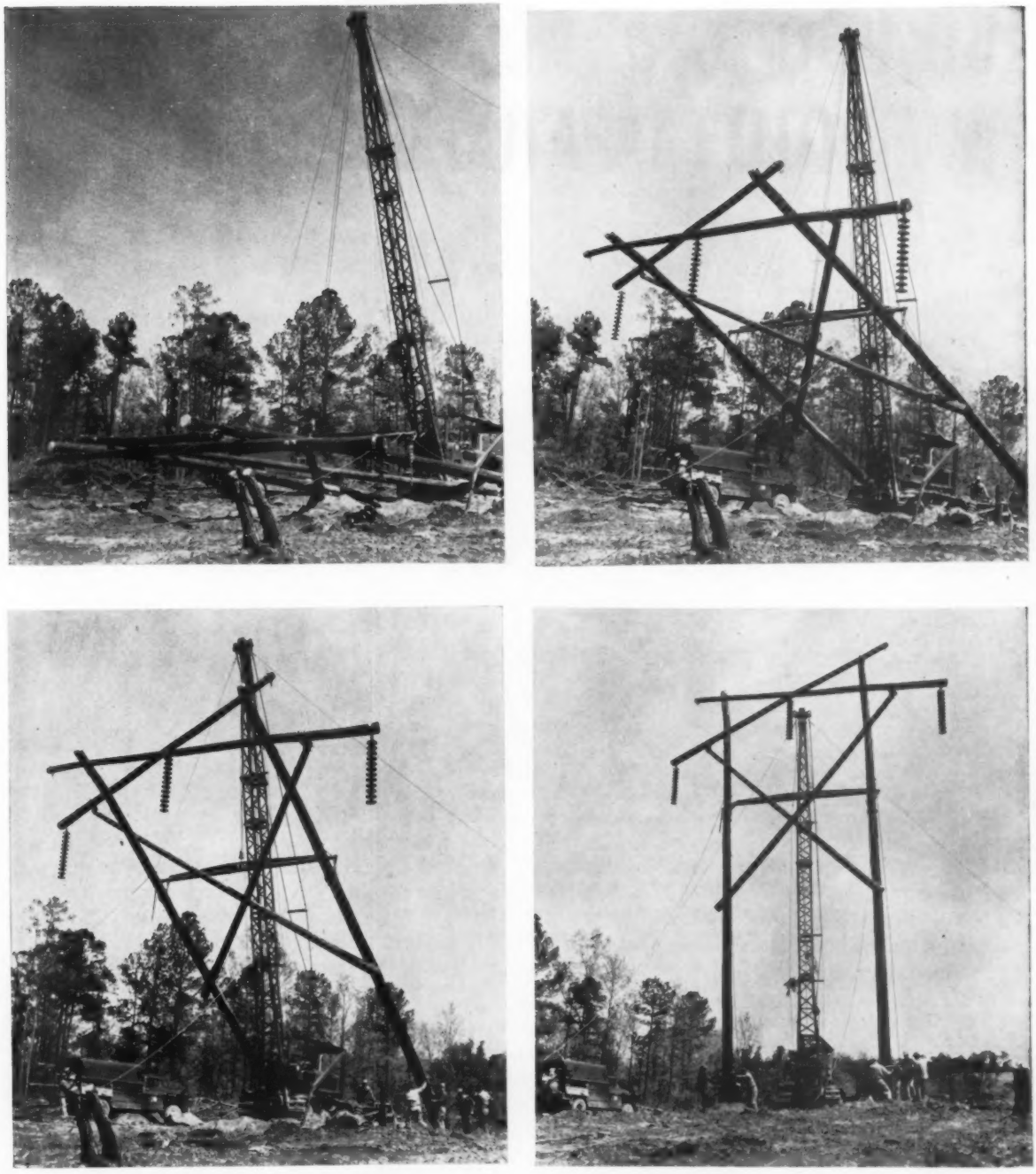
The crane mounting brackets were bolted directly to the rear of the tractor. Two specially-designed Braden winches were mounted at the rear of the tractor, one above the other, and driven by the tractor engine through a Tulsa dual power divider transmission.

The superstructure framing mounted on the tractor was made high enough to pick up the boom from the ground level without assistance.

Because the weight of the structural steel in the boom alone was 2,400 pounds and the weight of the assembled wooden pole structures was approximately 16,000 pounds, heavy counterbalances were required at the front of the tractor. The 5,000 pound bulldozer blade mounted on the tractor acted partially as a counter-balance in itself, but additional counterweights were required.

The designer and builders have pointed out, however, that the blade's function as a counterbalance is incidental, since additional counterweights could have been added at a cost far less than that of the blade. The main advantage of the blade attachment is that the tractor can be used in leveling off the area prior to setting up the poles and it also can be used by the company on jobs other than that of pole setting.

After the tractor has been driven to the spot where the pole holes have been drilled, the driver faces



Steps in structure erection using special rigging setup.

the rear of the tractor and begins operating the crane from a separate seat.

The boom consists of five, 10, and 15 foot sections and, therefore, can be assembled in lengths varying from 30 to 60 feet. (The 50-foot length was used on the wooden structures and the 60-foot length on the steel). The boom is disassembled and removed from the tractor whenever the tractor is taken to another job. (The crane's most recent use has been in setting structures for a 110-kv line the company is building in the Waycross area).

The terrain in the 102-mile Plant Yates - Bonaire stretch ranged from firm, level land to rugged or swampy. The maximum number of wooden pole structures set on any one day was 16 and the minimum was two.

Cost of converting the tractor and adding the necessary materials was approximately $6,750. The boom was purchased second hand and rebuilt, increasing the length from 40 feet to 60 feet.

50,000 OPERATIONS WITHOUT A FAILURE!

Definite proof that FRANK ADAM type SAHD Shutlbrak Switches answer industry's need for a QUALITY heavy duty switch

That's the amazing record compiled by Frank Adam SAHD heavy duty Shutlbrak Switches in tests conducted recently at the company's Research Laboratories.

The tests were designed to determine the efficiency and stamina of the switches under the most exacting operating conditions. Tests included such factors as temperature, increased horsepower, die-electric and endurance.

"The results of the tests," says Floyd S. Green, chief of Frank Adam's Research and Development Laboratories, "was most gratifying. In 50,000 continuous operations —five times the requirement of the Underwriters' Laboratories, Inc.—there was not a single failure.

"Wear and tear on the switch at the conclusion of the tests was virtually negligible.

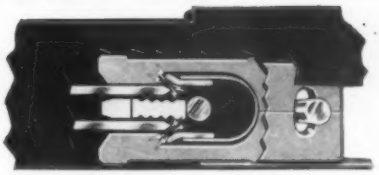
"The tests confirmed what we have always contended...that Frank Adam type SAHD Shutlbrak Switches thrive on work . . . that they are safe, dependable, long-lasting and trouble-free . . . and that they are unsurpassed for motor control, service entrance and any job requiring a heavy duty operating switch."

Take a tip from Mr. Green. Make your next heavy duty switch a Frank Adam type SAHD Shutlbrak Switch.

if it's FA . . . it's OK

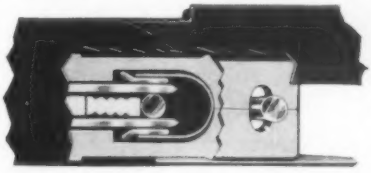
Features that make FRANK ADAM Shutlbrak Switches outstanding

CONTACTS "MAKE" or "BREAK"



The only points at which arcing can occur are on the outside edges of the line and load blades when contacting the arcing tips.

CONTACTS "ON"



Full contact being made with the round main contact roller on the inside of the line and load blades.

Frank Adam Shutlbrak Switches are horsepower-rated, front-operated, heavy duty operating switches with quick-make and quick-break mechanism. All current carrying parts are heavily electro silver plated.

The dominant feature of the switches is the shuttle mechanism, including main contact roller, which rolls under pressure and improves with use. (See illustration). This fact was definitely proven in the tests by the highly polished silver surface of the main roller.

"Make" and "break" of current is done when the outside edges of the stationary contacts meet the arcing tips, thus preventing any burning or pitting of the main contact roller.

Type SAHD switch has an interlocking fuse door which automatically locks when the current is "on" and permits access when the switch is "off". (An intermediate position of operating handle provides access to authorized persons). The handle also is arranged with padlocks in the "on" or "off" position.

Capacities of the SAHD switch are;
30 to 1200 amperes with front operated handles,
250 volts AC or DC or 600 volts AC or DC
in 2, 3 or 4 pole single throw.

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Economic and safety factors of cluster mounted transformers

This article continues the discussion started last month on the experience of one large company with cluster mounted transformers. Specifications are given this month for 12 and 13.2 kv systems.

By W. O. Whitt
Senior Distribution Engineer
Alabama Power Co.
Birmingham, Ala.

◆ WE DO NOT FEEL that the Alabama Power Company specifications are the optimum by any means. We do feel that the change to the cluster mount and direct pole mount transformers was a step in the right direction. The Distribution Standards Committee is constantly striving to improve our specifications.

The cluster mounted installations, using 5 kv cable, were universally accepted by the field personnel and numerous requests were received for similar 12 kv specifications. We found that the only 15 kv cable that the cable manufacturers would recommend was the shielded cable which was not economically sound for this use. Due to this, we asked the cable manufacturers if they had a 15 kv non-shielded cable that they would recommend and they advised that they believed their 15 kv non-shielded cable would do the job but could not guarantee it due to lack of operating experience.

We decided to buy the 15 kv non-shielded cable and get the operating experience. We now have approximately 100 installations using the 15 kv non-shielded cable made by seven different manufacturers in service in our Mobile, Southern, and Birmingham Divisions.

We are also adding installations of this type in order to get a broader experience with this cable. The first installation was made in July, 1955, and has given perfect service to date. We have experienced only one failure which occurred in an area subject to salt spray. Based on our experience we are very optimistic about this installation from an economic, safety and appearance standpoint.

Single-phase installations

Figure 7. This is the specification which we were using for mounting 7.2 kv, conventional transformers, 15 kva and smaller, on 12 kv systems prior to 1954. By stacking the hanger arm and substituting the bow brace for the flat crossarm brace, this same general drawing was also used for mounting 25 and 37½ kva transformers. As in the case of the 4 kv system, the primary jumper is located on extension pins on the ends of the arms; however, on this specification the primary cutout and arrester are installed on a crossarm located two feet below the primary crossarm position. This, of course, provides means of de-energizing the primary jumper for stringing services from the transformer pole.

Figure 8. This drawing is now used for mounting 7.2 kv single phase transformers on 12 kv systems or 7.6 kv transformers on 13.2 kv systems for all installations through 100 kva. Like the 4 kv installations, the transformer is installed at 30° to the main line at the secondary level. The arrester and cutout are installed on a combination bracket one foot below the primary crossarm position. The primary jumpers are #6 soft drawn copper.

Table 5. This tabulation shows the cost comparison between the direct pole mounted transformers and the crossarm mounted transformers and is based on the installed cost of material not common to both installations. The direct pole mounted installation provides an estimated saving of 82% on installed cost of material not common to both installations when compared with the crossarm mounted transformers 15 kva and below, while a savings of 88% is realized on 25 kva and 37½ kva installations. In terms of money on installations 37½ kva and below, the direct pole mounted transformers provide an average saving of $46 per installation. In addition to the savings realized on first costs, the crossarms are eliminated and maintenance costs reduced.

Table 6. The pole space required for mounting must again be considered for these installations. This slide shows that pole space saved by the direct pole mounted transformer varies from 3.75 feet on the 5 kva installation to 5 feet on the 37½ kva installation. This means on joint use routes located on city streets a 40 foot pole will accomodate direct pole mounted installations, 100 kva and below, and allow the communication company to contact the pole at approximately the 23 foot level. With the crossarm mounted transformer a five foot higher pole would be required. We feel that this is a very definite saving because transformers can be added without increasing pole heights in most cases.

From a safety standpoint, there is very little difference in the two installations. In both installations, the primary jumpers adjacent to the secondary are de-energized when the primary cutouts are opened. The same may be said of the primary jumper from the primary conductor down to the cutouts, since in both cases this jumper may be de-energized by removing the hot line clamp. Probably the biggest safety advantage of the pole mounted transformers is that the hazard of services located adjacent to the primary jumpers is eliminated.

It might be said then that the direct pole mounted transformers installed at the secondary level on

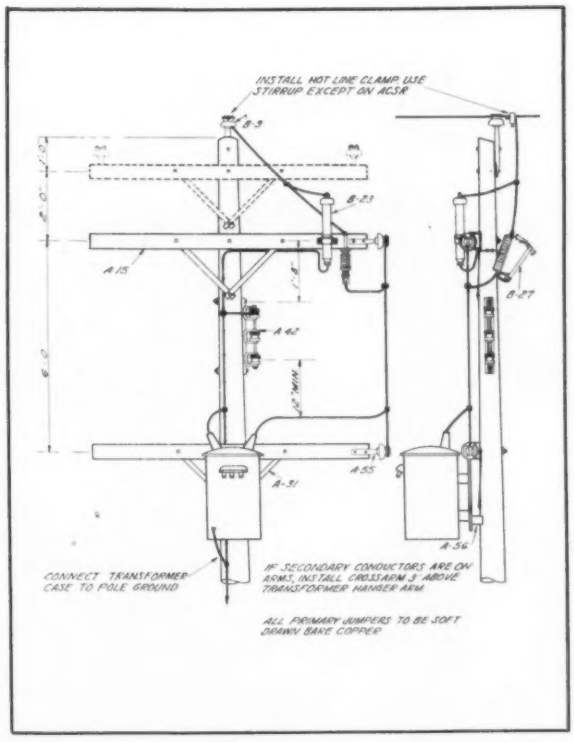

Fig. 7. Specification of 7.2 kv crossarm mounted transformer installations used prior to 1954.

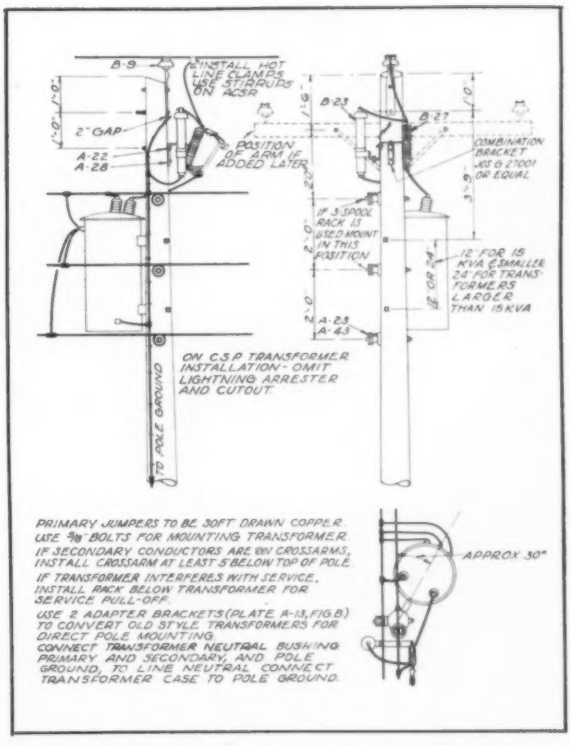
B-9
INSTALL HOT LINE CLAMPS USE STIRRUPS ON ACSR
2" GAP
A-22
A-28
POSITION OF ARM IF ADDED LATER
B-23
B-27
COMBINATION BRACKET NOS G 27001 OR EQUAL
IF 3 SPOOL RACK IS USED MOUNT IN THIS POSITION
12" FOR 15 KVA & SMALLER 24" FOR TRANSFORMERS LARGER THAN 15 KVA
A-23
A-43
TO POLE GROUND
ON C.S.P. TRANSFORMER INSTALLATION - OMIT LIGHTNING ARRESTER AND CUTOUT
PRIMARY JUMPERS TO BE 30FT. DRAWN COPPER.
USE 5/8" BOLTS FOR MOUNTING TRANSFORMER.
IF SECONDARY CONDUCTORS ARE ON CROSSARMS, INSTALL CROSSARM AT LEAST 5' BELOW TOP OF POLE.
IF TRANSFORMER INTERFERES WITH SERVICE, INSTALL RACK BELOW TRANSFORMER FOR SERVICE PULL-OFF.
USE 2 ADAPTER BRACKETS (PLATE A-13, FIG B) TO CONVERT OLD STYLE TRANSFORMERS FOR DIRECT POLE MOUNTING.
CONNECT TRANSFORMER NEUTRAL BUSHING PRIMARY AND SECONDARY, AND POLE GROUND, TO LINE NEUTRAL CONNECT TRANSFORMER CASE TO POLE GROUND.
APPROX 30"

Fig. 8. Specifications for single-phase direct-pole-mounted transformer as adopted in 1954.

TABLE 5

COST COMPARISON 7.2 KV OR 7.6 KV
SINGLE PHASE TRANSFORMERS ON 12 KV & 13.2 KV SYSTEMS

Transformer Size	5	10	15	25	37½	50	75	100
Direct Pole Mounted	$ 7.00	$ 7.00	$ 7.00	$ 7.00	$ 7.00	$ 7.00	$14.00	$14.00
Cross Arm Mounted	39.00	39.00	39.00	57.00	57.00	—	—	—

Above cost figures represent the installed cost of materials not common to both installations. The cost of poles, transformers, cutouts, and arresters common to both specifications have been omitted.

TABLE 6

POLE SPACE REQUIRED FOR INSTALLATION

Transformer Size	5	10	15	25	37½	50	75	100
Direct Pole Mounted	7.5'	7.5'	7.5'	7.5'	7.5'	7.5'	7.5'	7.5'
Cross Arm Mounted	11.25'	11.25'	11.25'	12'	12.5'	—	—	—

Pole spaces required are based on average transformer heights.

TABLE 7

COST COMPARISONS 3 PHASE INSTALLATIONS
ON 12 & 13.2 KV SYSTEMS USING 7.2 & 7.6 KV TRANSFORMERS

Transformer Sizes	3-5 KVA	3-10 KVA	3-15 KVA	3-25 KVA	3-37½ KVA	3-50 KVA	3-75 KVA	3-100 KVA
Cluster Mounted	$104.00	$104.00	$104.00	$130.00	$130.00	$130.00	$154.00	$154.00
Cross Arm Mounted	143.00	156.00	156.00	156.00				
Platform Mounted					550.00	550.00	580.00	580.00

Above cost figures represent the installed cost of materials not common to both installations. The cost of pole, transformers, cutouts and arresters common to both specifications has been omitted.

TABLE 8

POLE SPACE REQUIRED FOR INSTALLATION

Transformer Size	3-5	3-10	3-15	3-25	3-37½	3-50	3-75	3-100
Cluster Mount	11.5'	11.5'	11.5'	11.5'	11.5'	11.5'	11.5'	11.5'
Cross Arm Mounted	11.0'	12.0'	12.0'	12.5'				
Platform Mounted					15.0'	15.0'	15.0'	15.0'

Pole spaces required are based on average transformer heights. Space required on platform mounted transformers based on structures installed in main primary lines.

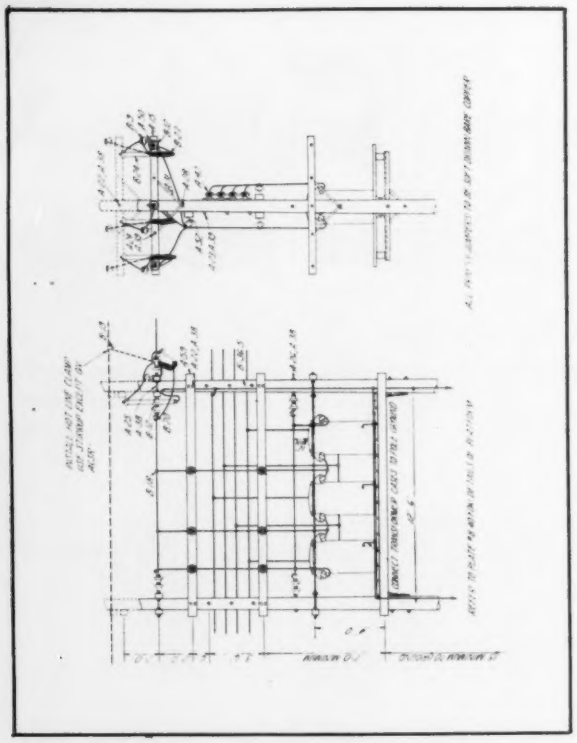

Fig. 9. Two-pole structure formerly used for mounting 13 kv three-phase banks, 37½ kva and larger.

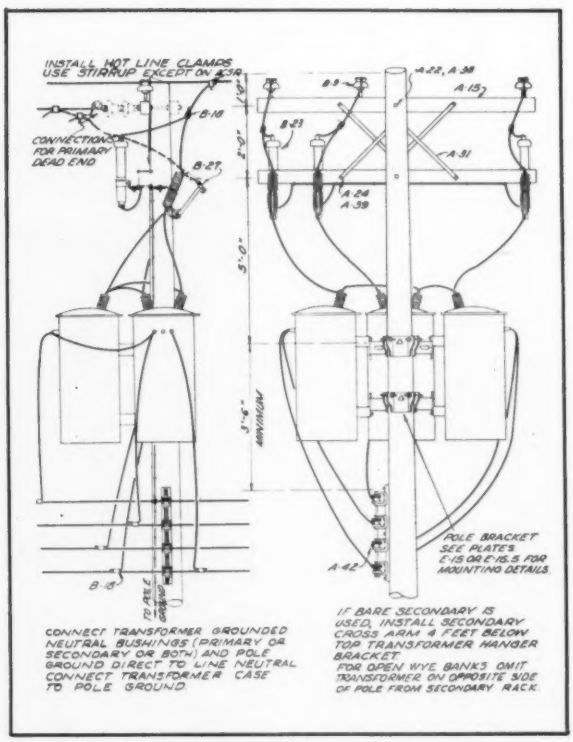
INSTALL HOT LINE CLAMPS USE STIRRUP EXCEPT ON ACSR
CONNECTIONS FOR PRIMARY DEAD END
B-10
B-27
B-9
B-21
A-22, A-38
A-15
A-31
A-24
A-39
A-42
POLE BRACKET SEE PLATES C-15 OR C-15.5 FOR MOUNTING DETAILS.
CONNECT TRANSFORMER GROUNDED NEUTRAL BUSHINGS (PRIMARY OR SECONDARY OR BOTH) AND POLE GROUND DIRECT TO LINE NEUTRAL CONNECT TRANSFORMER CASE TO POLE GROUND
IF BARE SECONDARY IS USED, INSTALL SECONDARY CROSS ARM 4 FEET BELOW TOP TRANSFORMER HANGER BRACKET.
FOR OPEN WYE BANKS OMIT TRANSFORMER ON OPPOSITE SIDE OF POLE FROM SECONDARY RACK.

Fig. 10. Present specifications for cluster-mounted three-phase 13 kv banks up to three 100 kva units.

12 and 13.2 kv systems do provide very definite economical advantages while from a safety standpoint, they compare closely with the crossarm mounted transformers.

Three-phase installations

Three-phase transformer banks, three 25 kva transformers and below, on 12 kv systems prior to 1954 were mounted on crossarms and the primary jumpers were installed on the ends of the arms with cutouts and arresters installed on a crossarm located two feet below the primary arm. The secondary was located above the transformers with a minimum separation of twelve inches between the secondary and primary neutral.

Figure 9. This drawing shows the two-pole structure which was used for mounting three-phase banks on 12 kv systems where transformers were 37½ kva and larger. As in the case of the 4 kv installations, this redesigned two pole platform structure is still used to serve large power customers where propects for increased load are good; however, it is a very expensive installation for mounting 37½, 50, 75 and 100 kva transformers.

Figure 10. This drawing shows the specifications for installing three 100 kva transformers and below on 12 and 13.2 kv systems. The primary cutouts are located on a crossarm two feet below the primary arm, and the primary jumpers are #6 soft drawn copper wire. The secondary is located below the transformers.

Table 7. This tabulation shows the cost comparison between the cluster transformers and the crossarm and platform mounted transformers required with the old specifications. These cost estimates include only that material not common to both installations. On three-phase installations, with 25 kva transformers and below, the cluster mounted provides an average saving of 28% or an average of $42 per installation. When the cluster mounted transformers are compared with transformers mounted on platforms, 37½ kva through 100 kva, we again see rather large savings. For these installations, the cluster mounted installations show an average saving of 76% or approximately $423 per installation. Again, maintenance costs should be reduced by the elimination of the crossarms. The pole loading is more evenly distributed with the cluster mounted banks and the tendency toward pole bending should be reduced.

Table 8. When we compare the pole space required for mounting the cluster mounted transformers as opposed to the old specifications, we find that for installations of 25 kva transformers and below approximately the same mounting space is required. When compared with the platform structure, the cluster mounted installation requires approximately 4.5 feet less pole space.

From a safety standpoint, the cluster mounted installation moves the secondary down to a position below the transformers and eliminates the services adjacent to primary conductors. With the exception of this feature, both the cluster mount and crossarm mount compare very favorably.

The cluster mounted transformer installations then provide a saving on first installation cost, reduce pole space required for mounting the larger banks, and provide accessibility to the secondary conductors.

ON THE LINE...

New Hubbard Faultmaster Keeps Pace With Growing Systems!

Small bore single vent tube provides high pressure positive expulsion. Fibreglass reinforcing assures long tube life.

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Unique, high strength recoil members and husky fasteners absorb, minimize and distribute the stresses of high fault interruption over the sturdy, solid porcelain column. The entire current path is silver plated and current transfer points are under spring pressure. Springs are made from non-aging materials and designed to operate well below their elastic limit to insure positive contact pressure throughout the useful life of the cutout. All working parts are of corrosion free non-ferrous materials. Get the full story today from your Hubbard distributor or write for a copy of Bulletin P-756.

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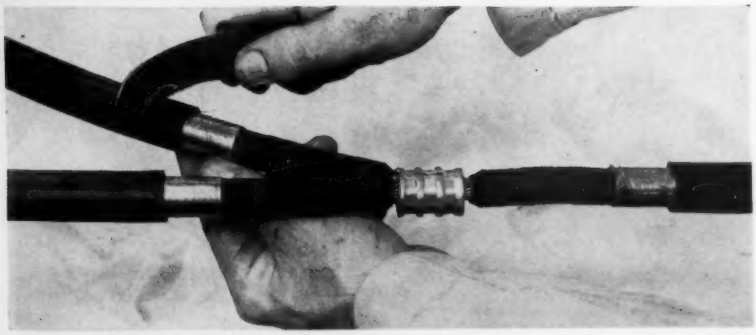
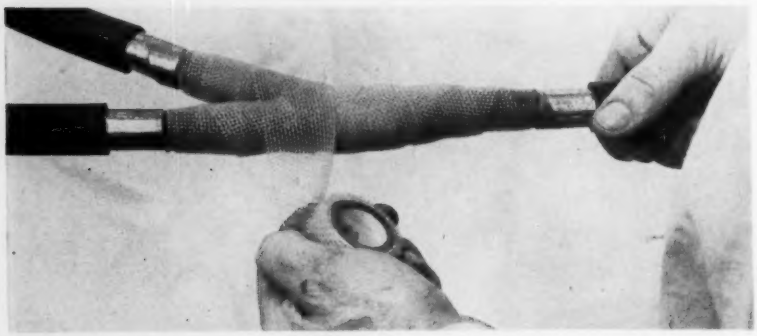
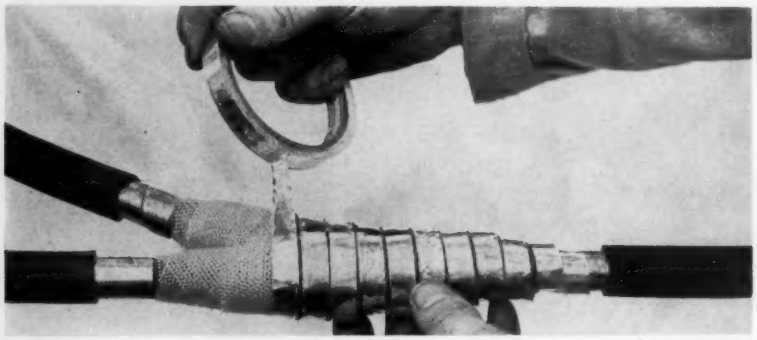
Protection and insulation of electrical splices



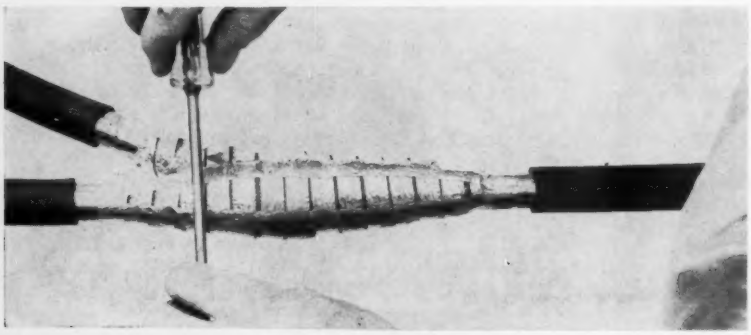
Cable is prepared in usual manner, using desired connector. Insulation is thoroughly scraped to provide a good adhering surface for resin.



Wrap cable in successive servings of spacer tape which provides a mechanical build-up yet allows ample space for resin to penetrate.



Shielding tape is wrapped around the first layer of spacer tape to allow for a layer of resin on both sides of the shielding.



Strips of foil tape are run from shield to shield on both the main cable and the branch to insure continuous shielding.

◆ SPLICES shot from a gun, a method designed to protect and insulate electrical splices with epoxy resin injected into a mold tailor made in the field, has been introduced by the Minnesota Mining and Manufacturing Co., of St. Paul, Minn.

Called the "Scotchcast" resin pressure splice, the new method is expected to find wide usage among utilities and power companies, electrical contractors and communications concerns for both buried and aerial cable. Due to the versatility of the method, lead, rubber and plastic sheathed cable or even combinations of these as well as shielded cable can be spliced. The method has worked satisfactorily on oil-saturated cable, the 3M company said.

The pressure splice method uses an open mesh screen-like tape as a spacer material, wrapped around the splice. This build-up of open screening is covered with a liquid-impervious plastic tape holding an injection fitting to allow entry of the resin into the splice. The plastic tape in turn, is covered with a low stretch tape to restrict the expansion of the plastic envelope when resin is forced into the splice.

The adaptability of the new method allows the mold for the splice to be tailor made for each splice, providing moisture proof, void free, high dielectric strength insulation around nearly any size or shape of splice. Also it makes possible uniform quality splices in less time than previous methods and removes much of the factor of human error. The splices can be

made by electricians without extensive special training or experience.

Resin for impregnating the splice is supplied in a plastic envelope—the "Unipak" container — which holds resin on one side of a dividing membrane and a hardener, or activator, on the other. When the divider is broken, the resin and activator are mixed by squeezing the ends of the container forming a resin which sets up or cures through internal heat.

In preparing the splice, the insulation is first scraped to remove all wax, oil and dirt. The conductors are then fastened together with a suitable connector and the splice is wrapped with the spacer tape to the proper splice diameter.

The plastic injection fitting with its one-way, non-return valve is positioned at the proper point on the splice.

The plastic tape envelope is wrapped over the apron of the injection fitting to secure it firmly in place, wrapping away from the fitting to the ends of the splice forming a liquid-tight container for the resin.

Over the plastic tape is wrapped a layer of fabric tape to give the stretchy plastic added mechanical support against the pressure of the resin. The last layer of fabric tape can be compared to an automobile tire while the plastic tape is comparable to the inner tube.

With the fabric tape secured, the pressure gun is prepared. Similar to a caulking gun, it holds the "Unipak" container which acts as a disposable liner to eliminate clean-up.

First a plastic nozzle spout is pressed to the side of the "Unipak" by its adhesive back. Then the contents of the "Unipak" are mixed by squeezing. After it is thoroughly mixed, the "Unipak" is inserted in the gun with the plastic nozzle spout protruding from the gun spout. A puncturing tool (included with the gun) is pushed through the nozzle puncturing the container wall and the gun is ready to operate.

The nozzle is inserted in the injection fitting on the splice and the trigger worked to force resin into the built-up mold. Small air holes are punched in the splice casing at the ends farthest from the injection fitting. When resin begins to drip from these pin-holes, the splice is fully impregnated.

According to the manufacturer, the new method is adaptable to almost any kind of splice and the re-

The shielding is completed by soldering jumper wires across the splice from the original cable shielding.

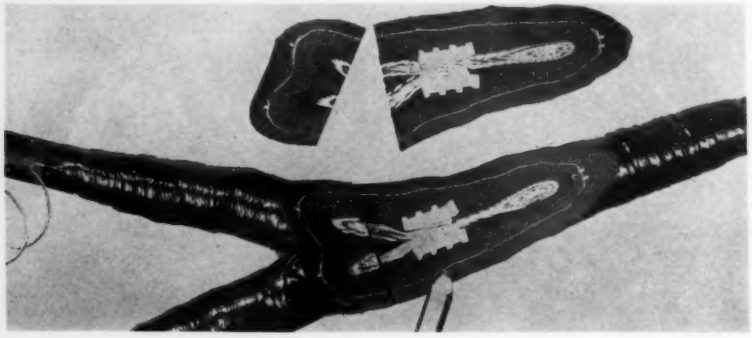
A new layer of spacer tape is applied until desired thickness is reached. Pressure-sensitive vinyl forms a liquid impervious seal.

A supporting wrap of fabric tape is applied over the plastic to provide mechanical support for the stretchy vinyl.

Resin and resin gun are prepared to "shoot" the splice. Nozzle fitting with pressure sensitive back is positioned on side of Unipak container.

Separating membrane between the resin and activator is ruptured and the container contents mixed by squeezing alternate ends of envelope.

With nozzle inserted into fitting, the resin is forced into splice under considerable pressure.



(Left) Cut-away shows complete saturation of resin to all points in splice, due to low viscosity of resin before it sets. Shielding tape, jumper wires, connector, and conductor are imbedded in resin.

quired insulating values may be regulated by increasing or decreasing the thickness of the spacing build-up.

Because of the custom-made nature of each splice, shielding for shielded cable can be made continuous through the splice by running it through the spacer tape build-up. External grounds may be attached before applying the spacer tape and parallel exit of cables from the splice can be arranged by padding cables into place with insulating putty before splicing.

Supervisory control

(Continued from page 55)

is sent which identifies the specific function performed. If there is no noncoded answer-back signal to the control signal, the system repeats the code three times and then brings in an alarm.

Special functions

Where special functions are to be performed, it is possible to send a "prepare" code which readies the distant equipment for operation upon receipt of an "operate" code. The answer-back signal of the "prepare" code can also be used to trigger the "operate" code automatically. It is also possible to prepare a number of remote functions for operation, and then operate them simultaneously.

When the "on-off" key of a "functional module" is placed in its middle position the module control leads are transferred to a terminal strip. From here they can be connected to timing equipment which will automatically send out the code of the module at specified intervals. This feature can be used where there is a requirement to request telemetering information periodically or where certain remote functions are performed at the same time each day. Any failure in the performance of these automatic controls could bring in alarm and lamp signals.

Components of system

Equipment required at either control or remote point includes a "transceiver," sequence and alarm circuits, power supply, one function module for each on-off function to be controlled and a twelve-push-button panel for controlling single-state functions such as ringing a bell at a remote point.

A function module has two lever-type keys and four lamps. The upper locking type key is for control of the "on" and "off" codes. The lower key provides the "start" for the code signal after it has been selected by the operation of the "on-off" key, and also functions to "disable" the module.

Lamps directly above and below the "on-off" key indicate the status of the remote function. These lamps are controlled entirely by the reception of coded signals from the remote point and can not be changed locally by the operator. The top lamp lights when there is a disagreement between the position of the "on-off" key and the status of the remote function. The "select" lamp indicates which of the modules of the transceiver is sending out the code for at any particular time.

A function module measures approximately 10 inches high by 1½ inches wide by 9 inches deep. Ten of these can be mounted side-by-side in a frame for mounting on a 19-inch rack.

"Week-end Wizard"

The spirit of do-it-yourself has made us a nation of handy men. At the same time, it has sharpened our appreciation of power tools and equipment: Simplex-TIREX cords and cables, for instance. These expertly engineered cords and cables are on the job everywhere: in home workshops, in factories, in mines, and on giant construction projects.

TIREX cords and cables, newly improved for greater flexibility, feature cured-in-lead Neoprene Armor that resists abrasion, oil, heat and water . . . gives longest service.

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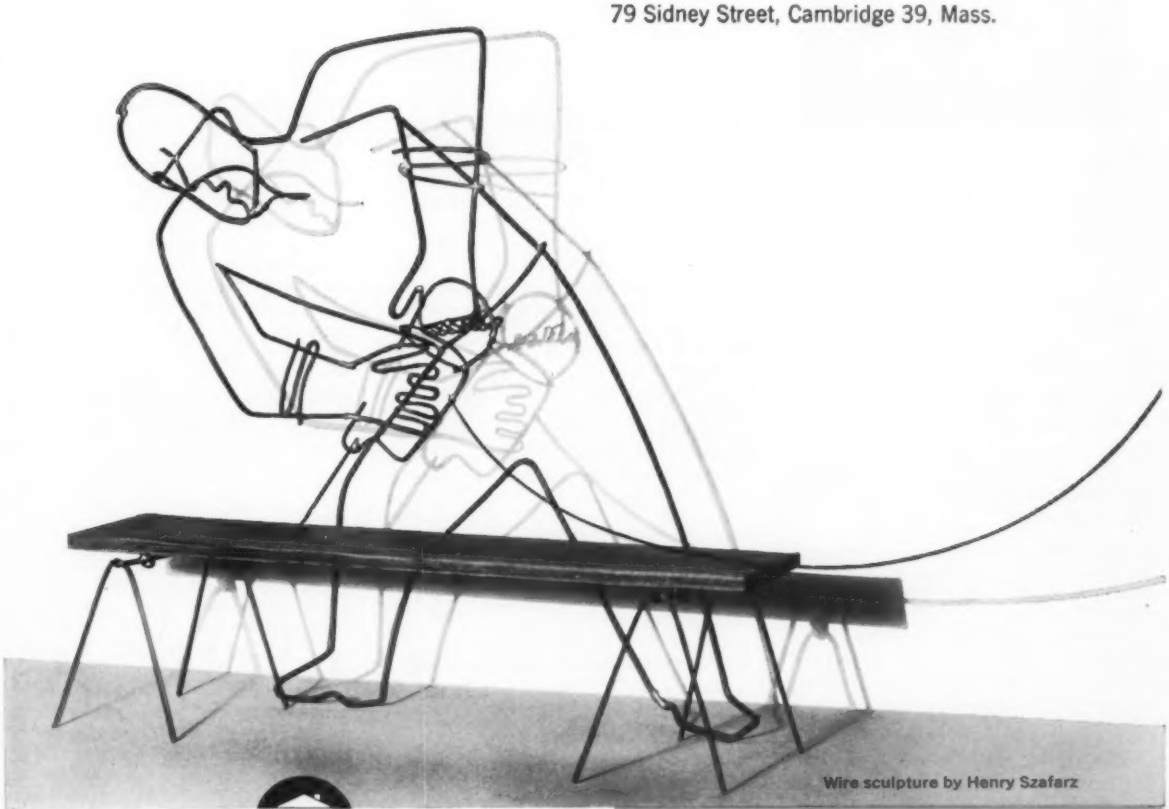
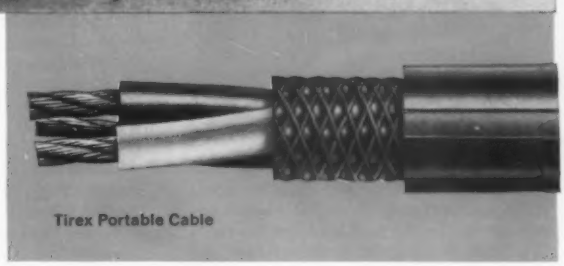
79 Sidney Street, Cambridge 39, Mass.



Wire sculpture by Henry Szafarz

LIVE BETTER ELECTRICALLY

Simplex

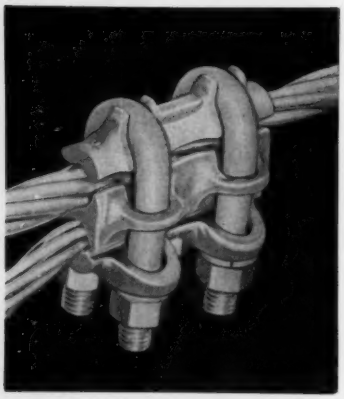


Tirex Portable Cable

Notes on new utility equipment

Parallel groove clamps reduce "bird-caging" of conductors

RECENTLY introduced by the Southern States Equipment Corp., of Hampton, Ga., is the type PAUL, all-aluminum parallel groove clamp. Center member is designed to mini-



mize flattening or "bird-caging" of conductors. U-bolts are pressed on to saddle to form integral unit.

Conductor range for the smallest of these fittings available will be #2-2/0 all-aluminum or #2 - 1/0 ACSR in either groove. The largest size PAUL will accommodate conductors ranging in size from 750MCM through 1033.5MCM all-aluminum or 605-MCM-900MCM ACSR in either groove.

For additional data, ask for item U-822, using the coupon on page 94.

Contact compound for aluminum

AN EFFECTIVE contact compound for aluminum, Cual-Aid, is available from the Penn-Union Electric Corp., Erie, Pa.

Because aluminum oxidizes very quickly, and its oxide is a poor conductor, joints in an aluminum elec-

trical circuit can have high resistance unless specially treated.

It's not enough to clean the surfaces to be joined—the contact areas must immediately be sealed from the air, or the oxide will re-form instantly. This sealing is accomplished by applying a special grease-base compound with metallic particles, "Cual-Aid" R, developed by Penn-Union Electric Corporation.

Cual-Aid is applied before joining conductor and connector. The aluminum surfaces are wire-brushed through the compound. This prevents air from reaching the cleaned contacts.

Stranded cables present a special problem, because each of the strands is covered with an oxide film. Each strand should be clean to lower the inter-strand resistance. Wire-brushing the cable assembly with Cual-Aid accomplishes this.

Cual-Aid is not an inflammable material, having the relatively high flash point of 350" Fahrenheit. And it does not stiffen to a jelly consistency until chilled to 25° below zero Fahrenheit.

For additional data, ask for item U-823, using the coupon on page 94.

Relay test instruments reduce set-up time

NEW RELAY test equipment is described in a data sheet available from the Multi-Amp Corp., 465 Lehigh Ave., Union, New Jersey.

This five-page brochure gives complete specifications, block diagrams and photographs of the new Multi-Amp line of relay test instruments. It includes a selector chart that enables a relay test man to determine at a glance the particular model most applicable to his needs.

This new line of Multi-Amp instruments consists of five models. Each model is tailored to suit the user's requirements, depending on the various types of protective relays employed. These instruments are portable, compact and enable the user to save approximately 75 per cent of the set-up time usually required for the testing of relays.

For additional data, ask for item U-824, using the coupon on page 94.

Rubber-tired digger designed for utilities

A FOUR-WHEEL-DRIVE earth-boring and pole-setting vehicle, first rubber-tired chassis of its kind designed especially as a digger carrier for utilities, utility contractors, and railroads, has been announced by Four Wheel Drive Auto Co., Clintonville, Wis.

Called the Blue Ox utility (BXU) digger, the new vehicle was developed and built for spot installation of new and replacement poles as well as for new line construction and operations ordinarily requiring crawler

tractors. The new BXU can be driven over paved or unpaved roads to job locations at speeds up to 55 miles an hour without damage to the roadbeds.

The rubber-tired digger unit can be operated on landscaped road shoulders and residential areas under normal conditions without tearing up such terrain. The Blue Ox utility unit's high traction and maneuverability enable it to traverse soft grades and muddy, sandy, rough, and other adverse terrain to reach digging and pole-setting sites.

The Blue Ox utility vehicle has rear-mounted digger and winch and can be equipped with an additional front-mounted winch. Or the chassis can be outfitted with an aerial tower for use in off-road power-line maintenance, insulator washing, and similar tasks. The BXU chassis is engineered for maximum tower load and torsion for use with any type 33-foot, 360-degree tower.

For additional data, ask for item U-825, using the coupon on page 94.

Smaller lightning arresters with series gap structure

PRODUCTION of an entirely new line of Thorex lightning arresters has been announced by the Ohio Brass Co., 380 North Main St., Mansfield, Ohio.

These arresters feature a new design principle of series gap structure called Dynagap. Incorporation of the Dynagap has made possible an entirely new order of durability and resistance to the influence of surface contamination, combined with drastic size reduction in station type models.

Basis of the Dynagap design is the transfer of almost 90 per cent of power-follow current limiting resistance, and duty, from valve blocks to the series gap element. This offers new and helpful latitude in valve block composition and permits incorporating higher surge current durability into the new valve blocks.

The new O-B Thorex Dynagap is

characterized by very small size. This

Outdoor current and potential

1945

THE FIRST . . . **FISHER-PIERCE PHOTOELECTRIC LIGHTING CONTROL**

. . . THE LATEST

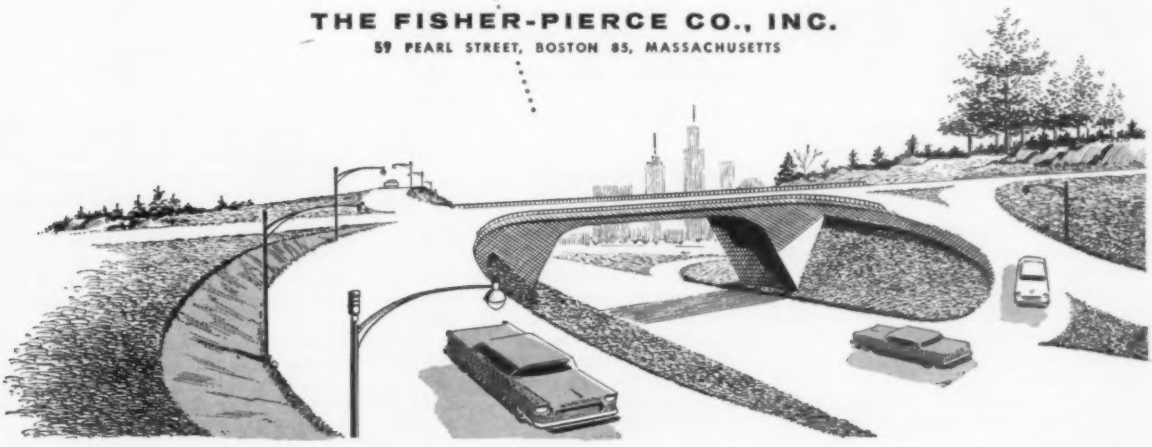
1957

The year World War II ended, The Fisher-Pierce Company began work with utility engineers to develop photoelectric controls. Automatic, dependable switching of street lighting circuits when illumination was needed, regardless of time of day, season or weather, was the fundamental idea. The Series 61300 was the first of five different, major groups of F-P controls that have followed.

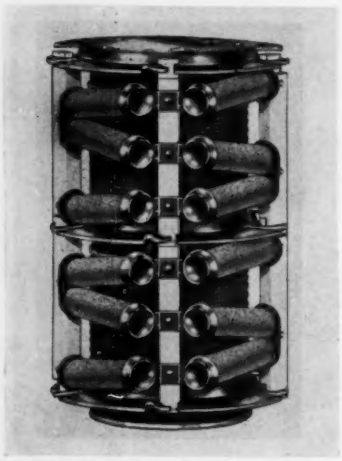
The experience has proved valuable to Fisher-Pierce and customers alike. Backed by an organization of more than 650 people, F-P today offers photoelectric lighting controls for all purposes . . . extensive sales and engineering services . . . research, development and production facilities to solve specific photoelectric/electronic equipment problems you may have. Your inquiry about F-P products, who uses them, and how you may use our development facilities for your own electronic equipment requirements, is welcomed.

THE FISHER-PIERCE CO., INC.

59 PEARL STREET, BOSTON 85, MASSACHUSETTS



characterized by very small size. This permits dimensions of high voltage station type arresters to correspond in height and diameter with equivalent-rated NEMA switch insulator stacks. This size advantage also permits the use of electrically-continuous housings. Elimination of stacking units in



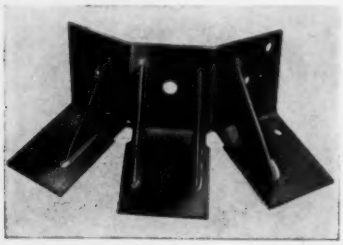
high voltage arresters removes the cause of arrester damage due to surface contamination leakage currents.

Further advantage from small size of the new Dynagap is its interchangeable use in all arresters of the Thorex line. Intermediate types greatly benefit from vital operating parts identical to those used in station types.

For additional data, ask for item U-826, using the coupon on page 94.

Bearing plates prevent dislocation of poles

THE POLE bearing plates, manufactured by the A. B. Chance Co., 210 North Allen St., Centralia, Mo., are used in pairs, at the butt of a pole,



and are designed to prevent uplift forces from pulling a single pole out of the ground or upsetting the balance of poles on H-frame transmission lines.

Weighing 18 pounds per unit, a pair of pole bearing plates provide a collective 200 square inches of cone-shaped bearing surface. Made of one-quarter-inch mild steel, Chance pole bearing plates are available in either an asphalt-paint or a hot-dip galvanized finish.

For additional data, ask for item U-827, using the coupon on page 94.

Outdoor current and potential transformers are redesigned

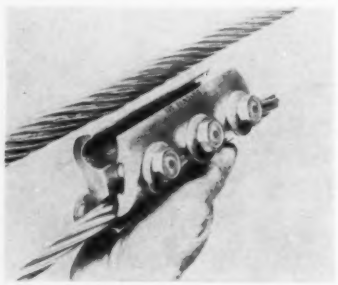
THE STANDARD Transformer Co., Warren, Ohio, has introduced its completely redesigned line of outdoor current and potential transformers, in voltages through 72,000. All units are vacuum impregnated to remove all traces of air from the core and coil assembly. Most models can be mounted in any position. Units are smaller and lighter. The new line meets all ASA, EEI and NEMA mounting and accuracy standards. Specifications and dimensions are available from Standard Transformer or its representatives.

For additional data, ask for item U-828, using the coupon on page 94.

Cable clamps eliminate loose-part interruptions

SMOOTHER, QUICKER cable installation, without the usual fumbling for loose parts, is made possible today by a new line of clamps introduced by Aluminum Company of America, Pittsburg 19, Pa.

The clamps, known as 480 Series, can be applied without being disassembled. Nuts have been eliminated, enabling linemen to make installations without loose-part interruptions. An additional timesaver is a newly-developed universal parallel groove design, making it possible for three clamps to cover the full range



from #2 to 397.5 MCM in ACSR, and from #2 to 400 MCM in stranded aluminum conductor.

Top and bottom parts of the clamps are sturdy, solid Alcoa aluminum alloy extrusions. Tapped bolt holes have strong threads, while bolts are anodized to reduce thread friction.

For additional data, ask for item U-829, using the coupon on page 94.

Triplex conductors for uncluttered poles

TOUGH, WEATHERPROOF insulation of Geon polyvinyl materials with exceptional electrical properties is proving a rugged outdoor performer in line wire and service drops. Triplex wire, manufactured by Southwire Company, Fertilla St., Carrollton, Georgia, utilizes the excellent physical properties and aging characteristics of B. F. Goodrich

chemical's Geon 8817 compound to withstand the punishment that goes along with outdoor wire installation.

The wire is constructed of two Geon-insulated conductors intertwined with a central strand of solid steel which acts as a ground and also lends additional strength. Previously, three separate wires were required, cluttering up poles and limiting the number of homes that could be serviced from one location.

The wiring must withstand pulling over crossarms, dragging along the ground, and other punishment while still being light, small in diameter, flexible, and generally easy to handle.

The insulation of Geon resists the attack of sun, oxygen, and ozone and, in industrial areas, withstands oils, greases, and the effects of airborne acids, alkalis, and other chemicals. The Triplex wiring also resists flame and will not support combustion.

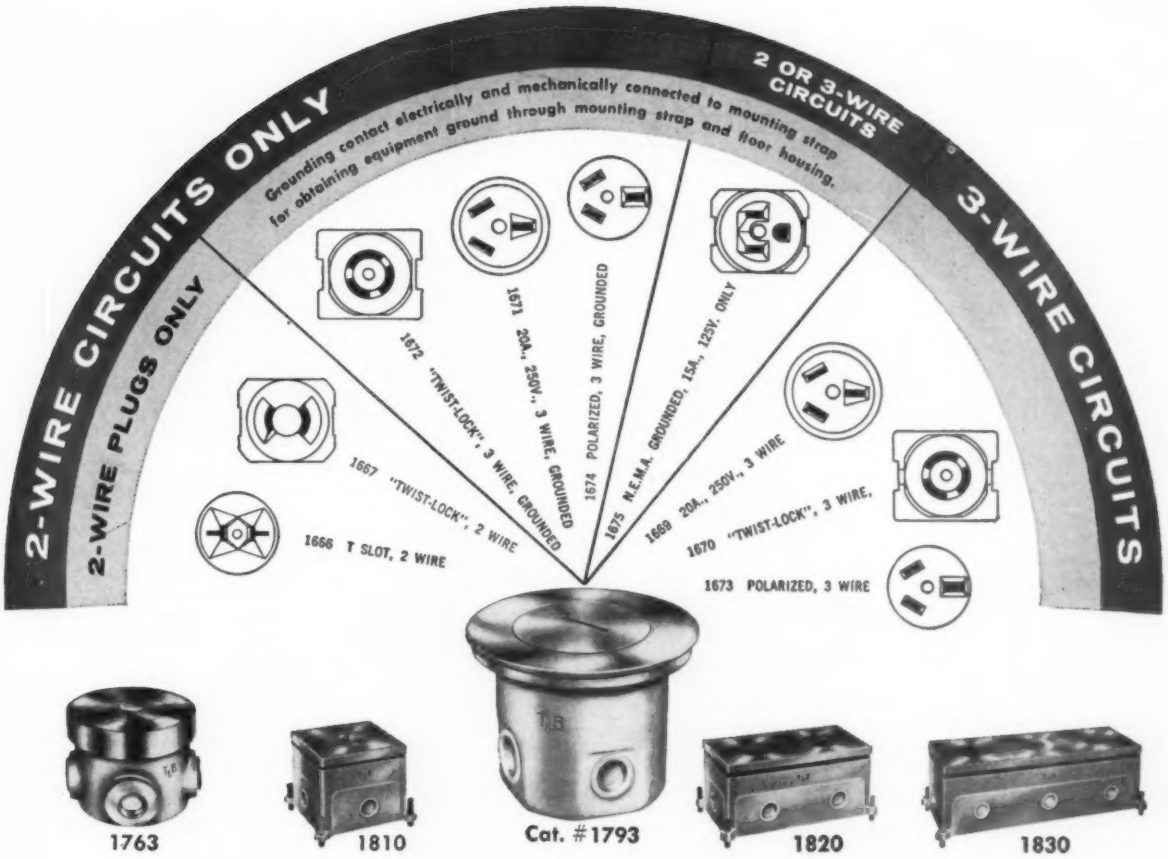
For additional data, ask for item U-830, using the coupon on page 94.

Hydraulic hole digger assures straight holes

ADDITION of a hydraulic hole digger to its line of utility bodies and equipment has been announced by McCabe-Powers Auto Body Co., 5900 N. Broadway, St. Louis 15, Mo.

The digger, designated "Earth-Master," is ideally suited for use with the Powers-American Series PM-2 "Pole-Master" hydraulic derrick. It can be installed on most "Pole-Master" derricks now in use, or factory-mounted in conjunction with a derrick and body built to fit individual operating requirements.

Unit is fully-hydraulic in operation; powered by a hydraulic pump driven by the truck engine. It will dig holes up to 9'4" in depth, at various angles, in practically all types of soil. The auger is guided at all times, to assure straight, clean holes. It travels up and down on a twin-column support frame which can be turned to various positions and extended or retracted to fit terrain and working conditions.


2-WIRE CIRCUITS ONLY
2-WIRE PLUGS ONLY
Grounding contact electrically and mechanically connected to mounting strap for obtaining equipment ground through mounting strap and floor housing.
2 OR 3-WIRE CIRCUITS
3-WIRE CIRCUITS
1666 T SLOT, 2 WIRE
1667 "TWIST-LOCK", 2 WIRE
1672 "TWIST-LOCK", 3 WIRE, GROUNDED
1671 20A., 250V., 3 WIRE, GROUNDED
1674 POLARIZED, 3 WIRE, GROUNDED
1675 N.E.M.A. GROUNDED, 15A., 125V. ONLY
1669 20A., 250V., 3 WIRE
1670 "TWIST-LOCK", 3 WIRE,
1673 POLARIZED, 3 WIRE
T&B
1763
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New! T&B floor box receptacle

MATCHES YOUR CIRCUIT WIRING AND THE PLUG ON YOUR EQUIPMENT

Here's a convenient money saver from T&B . . . designed to make the use of many types of receptacles easier and more readily available. T&B receptacles (there's one for every need) fit all T&B floor boxes . . . and they can be changed in a matter of minutes should you later install equipment which requires a change in receptacles.

For full information on T&B floor boxes and receptacles, contact your T&B distributor today — he will show you how to save money on installed costs, save time, and safety-ize your job with T&B floor box receptacle combinations.

LOOK FOR THE SIGN —

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IT'S THE MARK OF AN AUTHORIZED **T & B** DISTRIBUTOR

The complete line of T & B fittings for conductors and raceways is sold only by recognized electrical wholesalers. It's our way of assuring you the service and savings of a friendly local source. Call him for all your electrical needs. T-510

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MANUFACTURERS OF FINE ELECTRICAL FITTINGS SINCE 1898

Auger is rotated in either direction by a reversible hydraulic motor. It is raised and lowered by a separate hydraulic motor which, in combination with downward thrust that can be applied by the derrick, provides more than ample "down pressure" for digging in exceptionally hard soil. The digger controls are normally installed beside derrick controls in a rear body compartment, to give operator full view of all digger and derrick movement.

When hole has been dug, the digger will swing out of the way to permit use of the derrick for setting pole. The digger can be furnished with augers up to 20" in diameter, and with special heads to facilitate digging where soil condition would retard auger operation.

For additional data, ask for item U-831, using the coupon on page 94.

Outdoor switchgear has indoor features

A NEW TYPE of outdoor metal-clad switchgear, Shelterfor-M, that provides the features of indoor metal-clad in a weatherproof enclosure is available from Westinghouse Electric Corp., P. O. Box 2099, Pittsburgh 30, Pa. .

The Shelterfor-M design provides a sheltered aisle for all-weather operation and maintenance. The aisle space is large enough to permit two breakers to pass side by side.

Since the new design eliminates front and rear doors and encloses a common operating and maintenance aisle, it requires less plot area—as much as 40 per cent less—than conventional metal-clad units.

The new design is particularly suited to a double row - double bus arrangement. The common aisle per-

mits a weather-protected area for interchange of breakers between busses.

Other advantages are: foundation requirements are simple—no operating or breaker drawout pad is required.

The new Shelterfor-M utilizes standard indoor switchgear with front drawout breakers. The metal-clad units are shipped in the same form as standard outdoor metal-clad.

The additional enclosure is not attached until the basic unit is set down on a concrete pad. A metal panel is attached to the face of the pre-assembled cubicles to protect instrument panels during shipment. During assembly of the enclosure, this panel is removed and becomes the front wall of the enclosure.

For additional data, ask for item U-832, using the coupon on page 94.

Automatic hole digger needs no power take-off

AN AUTOMATIC digging tool that will dig 25 foot holes in six minutes from any jeep, truck, or tractor equipped with front or rear boom

and winch has been introduced by the Roper Manufacturing Co., 104 Elm St., Zanesville, Ohio.

Interchangeable augers from six inches to 24 inches in diameter are available with the Roper hole digger which does not need expensive power transmission drives in order to operate.

In addition to the great advantage of not requiring an expensive transmission in order to operate, the Roper hole digger does not require one or two men to ride the auger in order for the digger to dig. The weight of the gasoline motor mounted directly above the auger is more than sufficient. Finger tip controls make it easy for one man to operate.

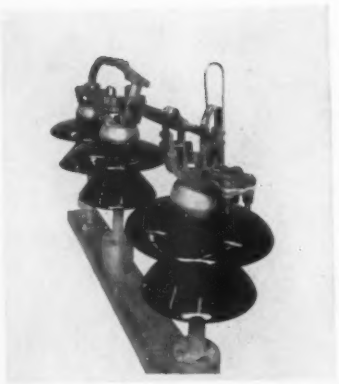
The rugged Roper heavy duty hole digger is compact and easily stored. It comes with standard six foot augers with extensions available up to 25 feet.

For additional data, ask for item U-833, using the coupon on page 94.

Outdoor switch features efficient ice breaking

A NEW LINE of RF-2 outdoor disconnecting switches for sectionalizing and isolating circuits has been announced by the General Electric Company's High Voltage Switchgear Dept., Schenectady 5, N. Y.

The new equipment features a rotating vertical break blade for highly efficient ice breaking operation, and inverted "U" shaped spring pressure contacts which increase pressure on the blade during momentary flow. The switch arm and ro-



tating mechanism have antifriction bearings throughout, and rotating insulator "stops" are located at the hinge to deliver maximum force to the blade.

Moving and stationary contacts are heavily surfaced with high density silver plating to increase conductivity and resistance to wear. Units can be mounted upright, vertical or underhung, and can be readily adapted for group operation.

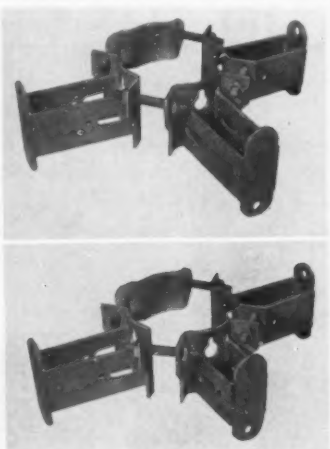
The equipment, which has successfully undergone severe ice and short circuit tests, is available in voltage ratings from 7.2-kilovolts to 345-kv, for currents from 400 through 4,000 amperes.

For additional data, ask for item U-834, using the coupon on page 94.

Pole mounting equipment increases climbing area

ADDITIONAL pole mounting equipment has been announced by the Universal Pole Bracket Corp., P. O. Box 1118, Houston, Texas.

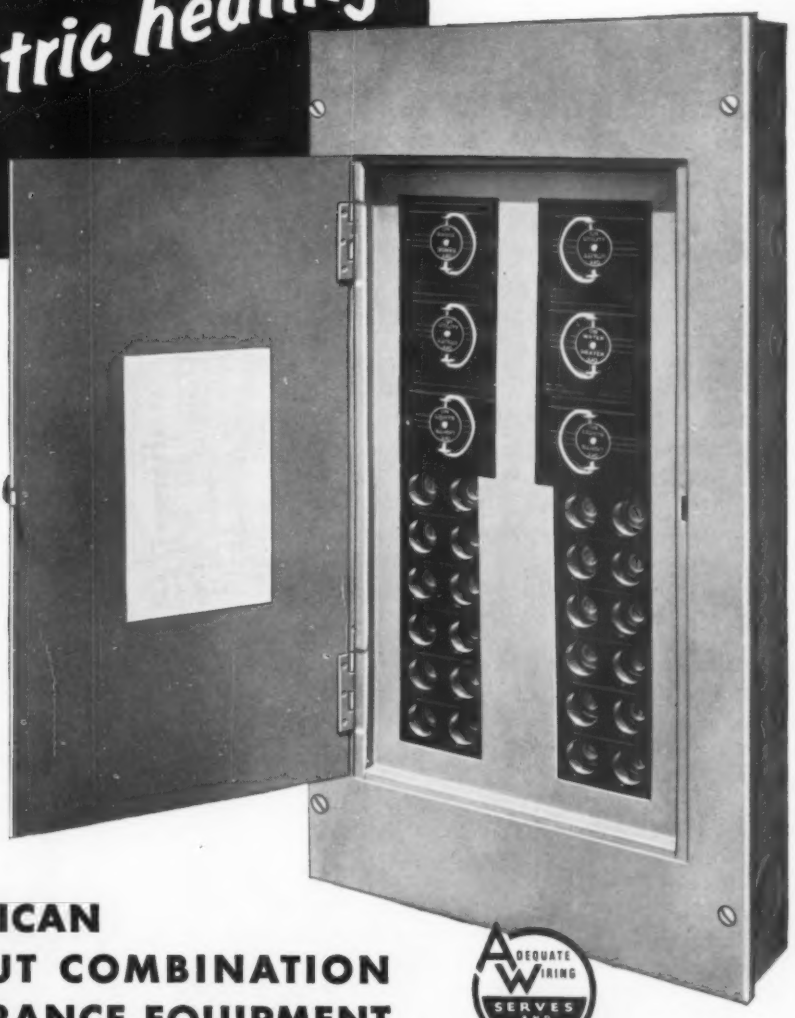
The upper photograph illustrates an extended model of their patented



pole bracket which places the face of the transformer lug nine inches from the pole surface, giving greater clearance between units as well as more climbing space. This is of particular importance to users of trans-

(continued on page 110)

NEW! for homes with electric heating



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Now you can provide all home Service Entrance facilities including heating, lighting, appliances, air-conditioning, etc.—in one compact cabinet. This new unit for 120-240 volt service features 200 amp. main lugs and contains six branch pull-outs in parallel—two 60 amp. and two 30 amp. for major appliances, and two 60 amp. for controlling 24 plug fuse branches for electric heating and/or lighting. For complete information and specifications write for Bulletin 220-3.

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there are Westinghouse distribution panelboards just right for you—whether your concern is installation or long-time use. For the man who installs, they iron out the rough spots in electrical construction. Factory assembled to meet *your* specifications. For the man who lives with them, their convenient layout, ease of maintenance and safety mark them for preference every time.

for extra protection, the circuit-breaker-type panelboards are tops. Positive action circuit breakers with moulded-plastic cases are arranged for simplicity in wiring and absolute dead front. De-ion® grids extinguish arcs swiftly and surely. The Type CDP offers "screw driver" convertibility when load changes are required.

for extra economy, the Type FDP offers versatility, simplicity, dependable operation . . . at lower cost. A complete line of fusible switches, all equipped with De-ion arc-quenching grids and quick-make, quick-break switching mechanisms. Convertible in a wide range of combinations.

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these books tell how to select the right panelboards to fit varying distribution problems. Write for your copies today.

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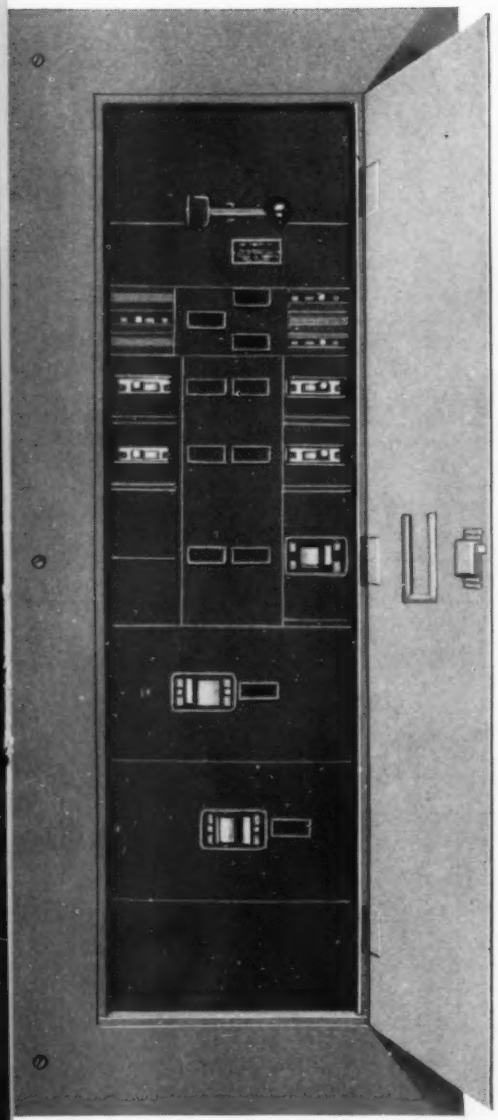
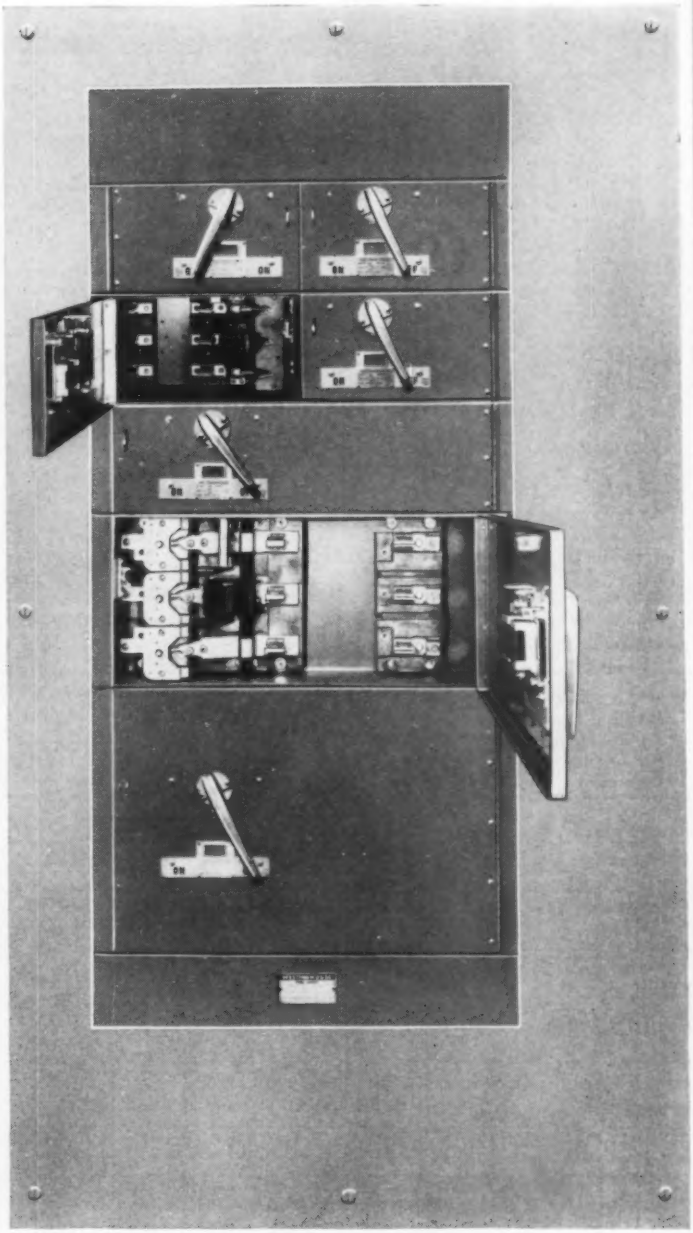


Type CDP Distribution Panelboard Utilizes E, F, G, J, K, KL, L and M frame AB De-ion circuit breakers; 15 - 800 amperes. Main lugs up to 1200 amperes—main breakers up to 800 amperes. Service voltages up to 600 volts a-c, 250 volts d-c.



Type FDP Distribution Panelboard Utilizes Type FDP De-ion fusible switch units; 30 - 600 amperes. Main lugs up to 1200 amperes—main switches up to 600 amperes. Service voltages up to 600 volts a-c, 250 volts d-c.

New, revised estimating tables continued in this issue

A NEW SERIES of estimating tables, completely revised in the light of more recent jobs and experience, are presented in this issue and will appear from month to month in forthcoming issues. These electrical estimating data sheets cover labor only and are arranged alphabetically with the basic material headings as a title for each tabulation.

Labor units given in these tabulations are based on a minimum of interference during work progress. The averages listed do not provide for abnormal job conditions, and any such abnormal conditions will require adjustments by the user, based on his experience.

The work units covered by each table are composed of one or more separate but closely related operations necessary for the complete installation of a particular basic item of electrical equipment. These operations associated with the basic material are described at the bottom of each table.

Most of the electrical estimating tabulations follow the same form. Column 1 at the left shows the size of the material to be installed. The second column from the left gives the time required to install the material, and it should be noted especially that this "productivity" column may be based on individual units or in the case of cable or conduit on units of 100 feet or 1,000 feet. The abbreviations "Ea." for each, "C" for hundreds, and "M" for thousands in Column 2 indicate the basis of the labor hours.

Columns 3 to 13, from the left, give the actual labor costs in dollars per unit of installation, at various hourly wage rates.

When calculations are being made for an hourly wage rate that doesn't correspond to any of the rates listed in Columns 3 to 13, the user may multiply the number of hours in Column 2 by 100 and this will give the labor cost based on an hourly wage rate of $1 per hour. By multiplying this by the hourly wage rate that actually applies in the user's locality, the exact labor cost of the operation may be obtained. Labor costs obtained in this way will be for units, hundreds of feet, etc., as given in heading of Column 2 of the table.

The labor units covered by the tables represent direct job labor costs and do not include delivery of material to site, engineering, estimating, or any other indirect cost.

As will be noted, some of the electrical estimating tabulations to be given will be for independent operations, such as excavating, backfilling, etc. These are included for use in preparing estimates on work of a special nature not covered under a specific table heading.

Tables will appear in alphabetical order.

CONDUIT "ON CONCRETE SLAB" WAREHOUSE

CONCEALED THINWALL

COND. SIZE	HRD. "C"	LABOR COST INSTALLED PER FT. AT FOLLOWING RATES										
		$1.25	$1.50	$1.75	$2.00	$2.25	$2.50	$2.75	$3.00	$3.25	$3.50	$3.75
1/2"	5.0	.058	.065	.063	.06	.068	.075	.083	.09	.098	.105	.113
3/4"	5.4	.043	.051	.06	.068	.077	.085	.094	.102	.111	.119	.128
1"	4.	.05	.06	.07	.08	.09	.10	.11	.12	.13	.14	.15
1 1/4"	5.4	.068	.081	.095	.108	.122	.135	.149	.162	.176	.189	.203
1 1/2"	6.9	.085	.102	.119	.136	.153	.17	.187	.204	.221	.238	.255
2"	8.6	.109	.129	.151	.172	.194	.215	.237	.258	.280	.301	.323
		RIGID										
1/2"	3.6	.045	.054	.063	.072	.081	.09	.099	.108	.117	.126	.135
3/4"	3.9	.049	.059	.069	.078	.088	.098	.107	.117	.127	.137	.146
1"	4.6	.059	.069	.081	.092	.104	.115	.127	.138	.150	.161	.173
1 1/4"	6.2	.079	.093	.109	.124	.140	.155	.171	.186	.202	.217	.233
1 1/2"	7.8	.099	.117	.137	.156	.176	.195	.215	.234	.254	.273	.293
2"	8.7	.109	.131	.152	.174	.196	.218	.239	.261	.283	.305	.328

E-102-B

LABOR: Includes handling material at site, bending, cutting, reaming, threading, placing conduit, tying down and connecting at terminus.

8-57

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One of the large wrapping machines which applies varnished cambric tapes to various types of Rockbestos A.V.C. cables. Rotating heads apply the specially selected tapes to provide specified mil wall thicknesses, desired lap and length of lay required by the type of cable in process.

Pictured is the application of fluffy asbestos prior to the impregnating and compressing process.

Impregnated asbestos compressed and felted to a smooth homogeneous wall ensuring long cable life.

Quality Varnished Cambric Tapes

+

felted asbestos walls impregnated with selected compounds add up to long life Rockbestos A.V.C. (N.E.C. Type AVA)

Made to Rockbestos' exacting specifications which incorporate standards beyond those called for by industry, Rockbestos varnished cambric tapes assure you of these plus values:

- ★ **A special surface treatment which insures that the tape will wrap properly, providing uniform dielectric strength and good bending characteristics in the completed cable.**
- ★ **Special surface hardness tests which mean varnish film that will not become damaged in processing or handling.**
- ★ **Rigid tape thickness requirements which give you uniformity of cable diameters.**
- ★ **Add to this thirty years of know-how in the application of VC tapes for high temperature application on Rockbestos A.V.C. cables and you have A.V.C. cable that insures trouble-free operation and long life.**

In the Rockbestos A.V.C. construction dense, felted asbestos walls, impregnated with selected compounds, seal the quality VC tapes away from air and moisture . . . give added strength against damage and flexing.

The result . . . you get long life and dependable service under every type of operating condition . . . in temperatures up to 230°F.

Complete construction and test specifications of Rockbestos A.V.C. are in the new booklet "Specifications RSS-88." Write today for your Free copy.

STOCKED COAST TO COAST Standard Rockbestos A.V.C. construction (N.E.C. types AVA, AVB, etc.) are available for immediate shipment. Call or write nearest branch office.

ROCKBESTOS PRODUCTS CORP.
NEW HAVEN 4, CONNECTICUT

NEW YORK • CLEVELAND • DETROIT • CHICAGO • PITTSBURGH • ST. LOUIS
LOS ANGELES • NEW ORLEANS • OAKLAND, CALIFORNIA • SEATTLE

CONDUIT (THINWALL) "IN SLAB" HOTELS & OFFICES

CONCEALED

CONDUIT SIZE	HRS. "C"	LABOR COST INSTALLED PER FT. @ FOLLOWING RATES									
		$1.25	$1.50	$1.75	$2.00	$2.25	$2.50	$2.75	$3.00	$3.25	$3.50	$3.75
1/2"	4.3	.054	.065	.075	.086	.097	.108	.118	.129	.14	.151	.161
3/4"	4.6	.058	.069	.081	.092	.104	.115	.127	.138	.15	.161	.173
1"	5.2	.065	.078	.091	.104	.117	.13	.143	.156	.169	.1822	.196
1 1/4"	6.9	.086	.104	.121	.138	.155	.173	.19	.21	.224	.242	.259
1 1/2"	8.6	.108	.129	.151	.172	.194	.215	.237	.258	.28	.301	.323
2"	9.6	.12	.144	.168	.192	.216	.24	.264	.288	.312	.336	.36
		RIGID										
1/2"	4.8	.06	.072	.084	.096	.108	.12	.132	.144	.156	.168	.18
3/4"	5.2	.065	.078	.091	.104	.117	.13	.143	.156	.169	.182	.195
1"	5.9	.074	.089	.103	.118	.133	.148	.162	.177	.192	.207	.221
1 1/4"	7.9	.099	.119	.138	.158	.178	.20	.217	.237	.257	.277	.296
1 1/2"	9.8	.123	.147	.172	.196	.221	.245	.27	.294	.319	.343	.368
2"	11.1	.139	.167	.194	.222	.25	.278	.305	.333	.361	.389	.416

E-102-B

LABOR: Includes handling material at site, bending, cutting, reaming & threading, placing conduit, tying down and connecting at terminus.

8-57

Electrical Estimating—III

CONDUIT (THINWALL) "ON SLAB" - HOTELS & OFFICES

CONCEALED

CONDUIT SIZE	HRS "C"	LABOR COST PER FT INSTALLED AT FOLLOWING RATES										
		$1.25	$1.50	$1.75	$2.00	$2.25	$2.50	$2.75	$3.00	$3.25	$3.50	$3.75
1/2"	4.1	.051	.062	.072	.082	.092	.103	.113	.123	.133	.144	.154
3/4"	4.4	.055	.066	.077	.088	.099	.11	.121	.132	.143	.154	.165
1"	5.	.063	.075	.088	.10	.113	.125	.138	.15	.163	.175	.188
1 1/4"	6.5	.083	.099	.116	.132	.149	.165	.182	.198	.215	.231	.248
1/12"	8.1	.101	.122	.142	.162	.182	.203	.223	.243	.263	.284	.304
2"	9.1	.114	.137	.159	.182	.205	.228	.250	.273	.296	.319	.341
		RIGID										
1/2"	4.6	.058	.069	.081	.092	.104	.115	.127	.138	.15	.161	.173
3/4"	5.	.063	.075	.088	.10	.113	.125	.138	.15	.163	.175	.188
1	5.6	.07	.084	.098	.112	.126	.14	.154	.168	.182	.196	.21
1 1/4"	7.5	.094	.113	.131	.15	.169	.188	.206	.225	.244	.263	.281
1 1/2"	9.4	.118	.141	.165	.188	.212	.235	.259	.282	.306	.329	.353
2"	10.6	.133	.159	.186	.212	.239	.265	.292	.318	.345	.371	.398

E-102-B

LABOR: Includes handling material at site, bending, cutting, reaming & threading, placing conduit, tying down and connecting at terminus.

8-57

Electrical Estimating—III

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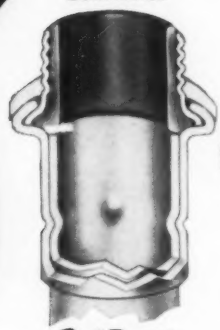
B-M

the original concrete-tight **INDENTER FITTINGS** *for E.M.T.*

Red Throat
Insulated Connector



Red Throat
Cross section

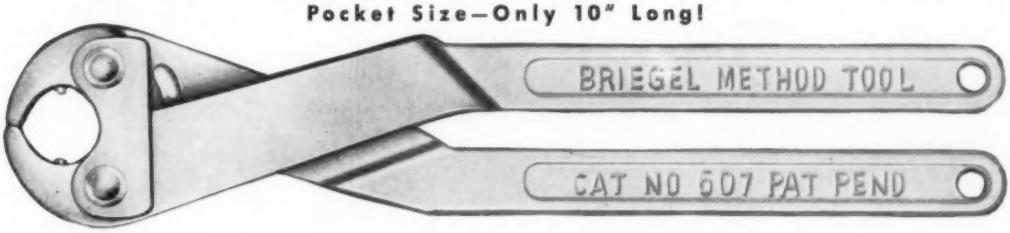
"BM" #100
Cutter for ½, ¾ and 1" E.M.T.

"BM" #1000
Holder for ½, ¾ and 1" E.M.T.

"BM" #600
Changeable Jaw Indenter

THE NEW BM607 INDENTER FOR ½" FITTINGS

Pocket Size—Only 10" Long!



FREE 30 DAY TRIAL OF THE NEW BM-607 ½" INDENTER

Your BRIEGEL Distributor has been authorized to give you a 30 DAY FREE TRIAL of the New BM-607 Indenter for ½" fittings.

This Smaller Lightweight Tool requires only half the hand pressure formerly needed to make neat deep positive grounded impressions.

Ease of action is made possible by an exclusive new Floating-Fulcrum principle that greatly increases leverage.

Try the New BM-607 Indenter Free for 30 Days. See for yourself how much lighter it is to carry—how much easier it is to use!

THIS FREE TRIAL OFFER IS LIMITED TO 30 DAYS

All B-M Indenter Fittings are U.L. Approved as concrete-tight and all Compression Fittings as rain-tight as well as for general use (File Card E10863). Also comply With Federal Specifications W-F-406.

TELESCOPE BM SYSTEM

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News of the industry

edited for Southern readers

AIEE to hold sixth textile conference

A FORUM, "What's New in Textile Electrical Equipment," will be one of the features of the Sixth Annual Conference on Electrical Applications for the Textile Industry, Nov. 14-15 at North Carolina State College, Raleigh. It is jointly sponsored by the textile industry subcommittee and the general applications committee of the American Institute of Electrical Engineers.

The two-day program will consist of three sessions featuring speakers of national prominence on electrical equipment and applications in the textile industry. A tour of the engineering laboratories at North Carolina State College also will take place.

A majority of those attending the conference are expected to be engineers and others who are directly connected with textile mills in either the design, installation or maintenance of electrical equipment.

Harrington becomes new NISA vice-president

THE RESIGNATION of Fred B. Wipperman as executive vice-president and his replacement by his assistant, Joseph M. Harrington, have been announced by National Industrial Service Association, international trade organization of electric motor, generator and transformer service and sales shops.

Joseph M. Harrington

Mr. Wipperman, who joined NISA as executive director in 1943, asked to be relieved of active management of NISA as a prelude to his eventual retirement. He has agreed to stay on as executive consultant.

Mr. Harrington, who joined the NISA executive staff last November, was previously secretary-manager of the Iowa Chapter of NECA, and an attorney for the Manufacturing Chemists Association. A native of Keokuk, Iowa, he is a graduate of Iowa and George Washington Universities.

Founded in 1933, the trade association has grown from a membership of 500 in 1943, when Mr. Wipperman became executive secretary, to nearly 1,600 members in five countries today.

Mr. Harrington has organized three new regional groups, the Rocky Mountain, Heart of America and Connecticut chapters of NISA, since joining the NISA staff, bringing the total number of local and regional chapters in the trade association to thirty-three.

Westinghouse builds new Charlotte plant

THE WESTINGHOUSE Electric Corporation will build a new manufacturing and repair plant in Charlotte, N. C., it was announced recently. Construction contracts, for which bids have already been asked, should be awarded by midsummer with completion of the building scheduled for mid-1958.

The new facility will replace the manufacturing and repair shop in a building that has been leased by Westinghouse at 210 East Sixth Street in Charlotte for 32 years. It will be located on a 6½-acre site about 3½ miles northeast of the Charlotte business district.

Otis R. Rae, vice-president of the Southeastern Region, said the 24,000 square foot building will be of brick, concrete block and steel construction and will be equipped with a 25-ton crane. The plant will include the most modern electrical repair facilities in the area and will handle all types of repair work on heavy industrial and utility equipment. Dimensions of the new plant will be 100 by 240 feet.

The old manufacturing and repair shop has been located at the East Sixth Street address since the operation was started in Charlotte in 1925. It is one of the manufacturing and repair division's 40 plants throughout the United States where electrical apparatus is serviced and built.

Atlanta host city for IES national meeting

THE NATIONAL Technical Conference of the Illuminating Engineering Society will convene at the Biltmore Hotel in Atlanta for four days beginning September 9. Papers to be presented will run the gamut of all that is new in the theory and techniques of lighting.

The first session, on applications, will include discussions on Acoustics and Lighting, Heating Problems of Artificial Illumination, Experience with High Level Office Lighting, and Footcandles, Footlamberts—What Next?

Photometry and colorimetry will be thoroughly covered by such topics as A New Look at the Measurement of Light and Color, Measurement and Specifications of Color Rendition Properties of Light Sources, Spectral Luminosity of Fluorescent Lamps, and Experimental Data and Computation of Effective Intensity of Flashing Lights.

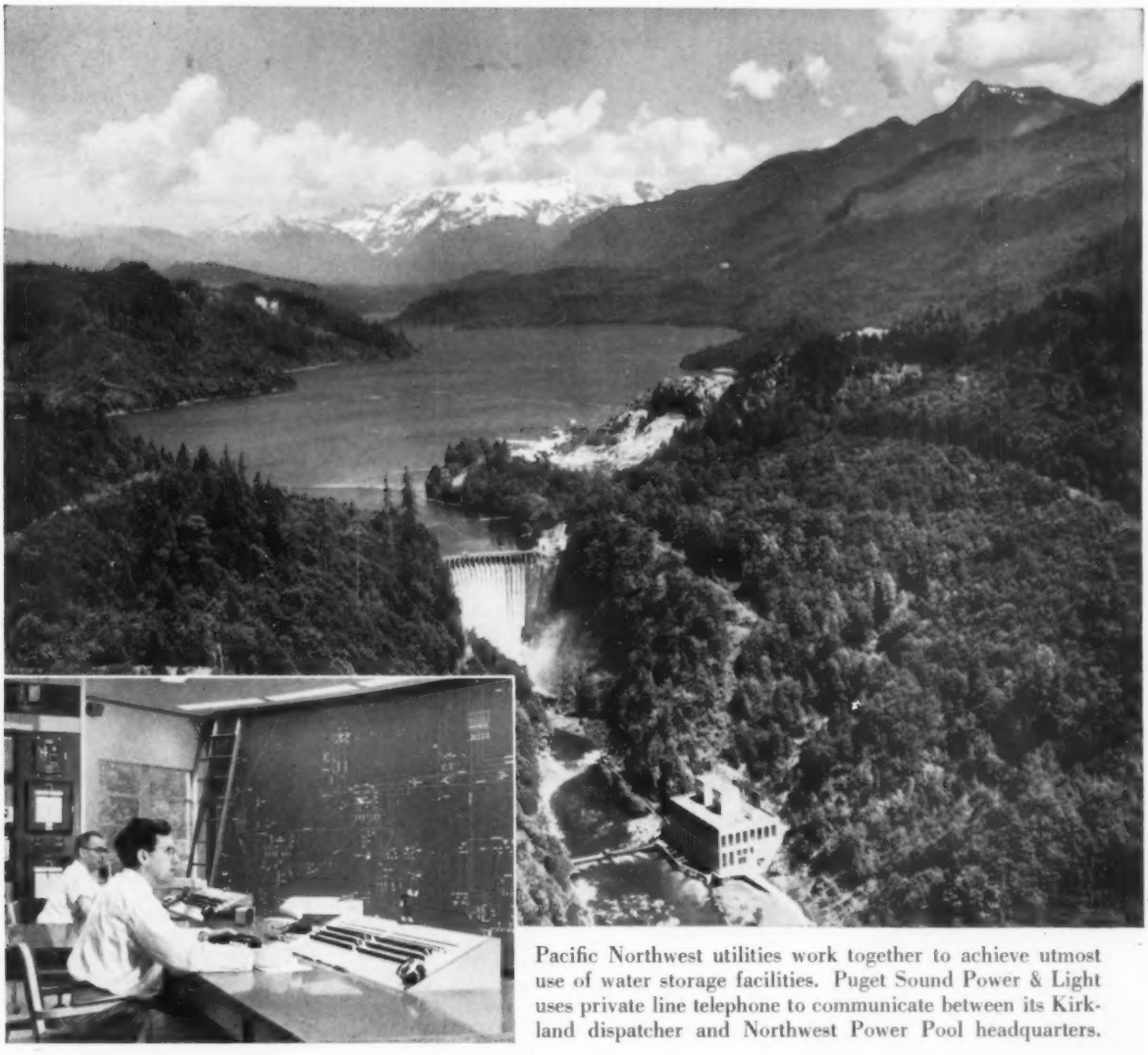
Session on sources

Design and Characteristics of Fluorescent Lamps Having a Non-Circular Cross Section heads the list for the session devoted to light sources, followed by papers on the subjects of Glow Discharge Characteristics of Fluorescent Lamps, Development of Deluxe Fluorescent-Mercury Lamps for Commercial Lighting Applications, and Smaller, More Efficient 100-watt Incandescent Lamps.

Special research findings will be presented which are concerned with Fog on Turnpikes, Discomfort Glare at Low Adaptation Levels—Multiple Sources, A Discomfort Glare Evaluator, and Brightness Distributions and Visual Discomfort.

Automatic Processing of Photometric Test Data for Street Lighting Luminaires, Interreflections in Asymmetrical Rooms, and Approximations and the Interflection Method will highlight the period devoted to lighting calculations.

A second session on applications will present discussions entitled Optical Applications of Mercury Short-Arc Lamps, Applications of



Pacific Northwest utilities work together to achieve utmost use of water storage facilities. Puget Sound Power & Light uses private line telephone to communicate between its Kirkland dispatcher and Northwest Power Pool headquarters.

Puget's dispatcher arranges power transfers by fast, reliable private line telephone

When Puget Sound Power & Light's dispatcher has power to spare—or when he wants to borrow some from his neighbors, he uses a private line telephone to make the arrangements.

Bell System private lines connect his operations center at Kirkland, Wash., with Northwest Power Pool headquarters at Spokane. Many Washington and other Northwest utilities are members of the pool.

Puget's dispatchers call hourly to report their demand, output and excess energy. This co-operation insures that all the region's power is utilized to make more low-cost energy available to people.

Efficient operation, smooth co-operation — both require dependable communications to keep costs down. Call your Bell Telephone Company business office, and our representative will be glad to help you study your requirements at no cost to you.

BELL TELEPHONE SYSTEM

PRIVATE LINE TELEPHONE • PRIVATE LINE TELETYPEWRITER • DATA TRANSMISSION SYSTEMS
CHANNELS FOR: REMOTE METERING AND CONTROL • TELEPHOTOGRAPH • CLOSED CIRCUIT TV

Non-Circular Cross-Section Fluorescent Lamps, Uses of New Mercury Lamps, and Fluorescent Strip Runway Lighting.

A presentation and discussion of the influence of Specular Reflection and a first hand account of the adventures in Lighting for TV Production are topics expected to be of considerable interest.

Street lighting studies

The portion of the program devoted to street lighting includes accounts of the Analysis of Light Distributions from Linear Source Street Luminaires, Application Experience with Mercury Vapor Lamps in Street Lighting Service, Estimating the Cost of Roadway Lighting Systems, and Outdoor Lighting Design for the New York International Airport.

Daylighting will terminate the technical papers session with featured subjects of A Photographic Method of Brightness Recording, Available Daylight from Skydomes, Illuminating and Brightness with Minute Louvers, Controlled Daylighting Using Horizontal Reflecting Louvers, and Practical Daylighting Prediction for the 1957 National Technical Conference.

In addition to the technical sessions, the program will include a general session on the first morning of the conference which will feature reports of the national officers, introduction of Fellows, and presentation of the IES Medal. Other special sessions scheduled are a meeting of the Residence Lighting Forum, a demonstration report on "Lighting Progress," and the annual competition to select national winners in the "My Most Interesting Lighting Job" contest.

SPECIAL AWARD—Manufacturers' representatives, James Millar Associates, of Atlanta, was one of three recipients of Clarostat's top awards at the company's recent annual sales meeting. Jim Millar, left, receives the Go-Getters Club trophy.

GE increases price of switchgear, transformers

GENERAL ELECTRIC Company has announced price increases in its high and medium voltage switchgear departments and in the transformer division, due to higher overall material costs and increased labor costs.

All products of the High Voltage Switchgear Department will go up seven per cent according to C. E. Burke, department general manager. These include power circuit breakers, distribution breakers, reclosers, station equipment, cubicles, isolated phase bus, and outdoor power switching stations and associated equipment.

H. F. Hentschel, general manager of the Medium Voltage Switchgear Department, announced that prices of metal clad switchgear and switchboard assemblies would be raised an average of five per cent.

Prices on many of the Transformer Division products will be raised approximately four per cent, stated R. W. Smith, division general manager.

Transformers affected are power transformers in large and medium sizes (above 500 kilovolt amperes), and transformers for substations, networks, load and distribution centers, and electric furnaces. Other items included are single-circuit and mobile substations, current-limiting reactors and grounding devices, voltage regulators, and high-voltage testing equipment.

Prices remain the same on pole-type and related subway-type distribution transformers, rectifier transformers, and high-voltage bushings.

Reynolds plant acquired by Sunbeam Lighting

ACQUISITION of the 4½-acre Reynolds Metal Company plant at Gary, Indiana, was announced recently by Herbert L. Krieger, president of the Sunbeam Lighting Co., manufacturers of lighting for commercial, industrial, and institutional applications.

The new facility, to be designated Sunbeam Lighting Co., Inc., Eastern, is located in the Glen Park section of Gary at 3840 Georgia St.

Officers will be Herbert L. Krieger, chairman of the board, Phil R. Freeman, president, Mac Bodian, vice-president and Irving Weisbart, vice-president.

The new plant will manufacture and market to the thirty-seven Eastern states, utilizing Sunbeam Lighting's established network of area distributor organizations. The full lines of Visionaire products, heretofore manufactured at the Los Angeles main-plant facility, will also be fabricated at the new plant.

Henry Gluck assumes the position of national sales manager of the Sunbeam Lighting Company,

Henry Gluck

with an impressive record of setting up and administrating aggressive sales distribution structures for important manufacturers. Mr. Gluck will headquarter in Los Angeles and will act as over-all coordinator between Eastern and Western operation, at administrative, manufacturing and marketing levels.

Raybro opens sixth branch in Florida

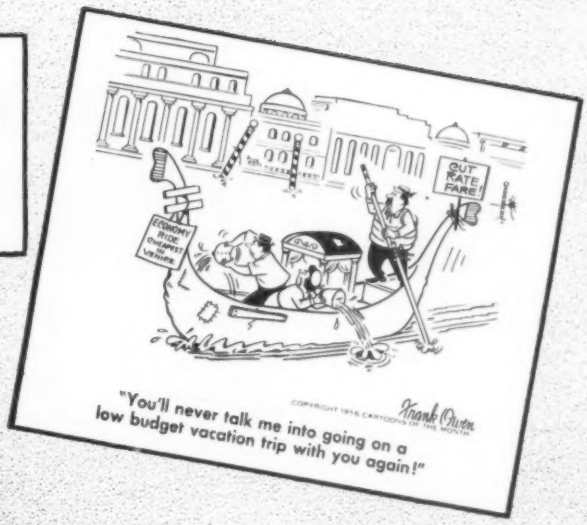
M. O. HOLLIS, executive vice-president of Raybro Electric Supplies, Inc., has announced from its headquarters office in Tampa, the opening of the company's sixth branch operation in Lakeland, Fla. Raybro's newest office and warehouse is located at 508 N. Ingraham Avenue in Lakeland and will serve the greater part of Polk County, including areas formerly covered from Raybro's Tampa and Orlando branches.

Robert Q. Coram, former territory salesman covering most of the same accounts out of the company's Tampa office, will be in charge of the Lakeland operation. He joined the Raybro organization in September of 1948, starting as a clerk in the warehouse.

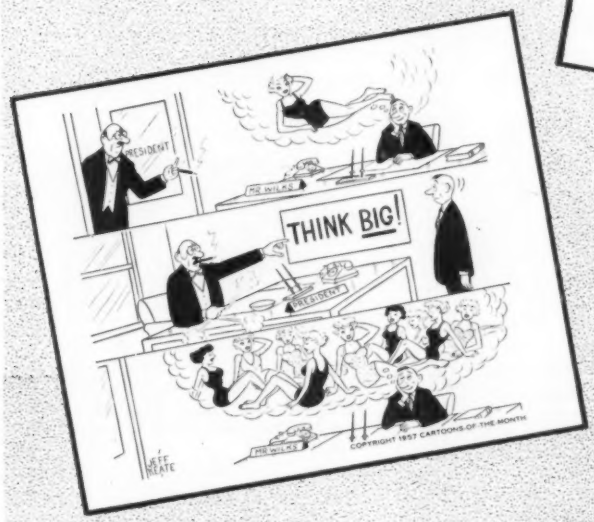
L. M. (Murray) Huggan, sales-

man from Raybro's Miami branch, has been transferred to the Lake-

Your Work Can Wait!



"You'll never talk me into going on a low budget vacation trip with you again!"



"...hello, hello...Mr. Crawford...hello..."

"By the way -- have you looked in those sleeves?"

"I'm like Ed... I hafta sort of get off to myself to really concentrate on something"

nell as vice-president of engineering of Anaconda Wire & Cable Co

man from Raybro's Miami branch, has been transferred to the Lakeland office and will assist Mr. Coram in sales work. Les Williams and Joel Belisle, originally associated with the company's Tampa branch, have also been transferred to Lakeland, to assist with counter sales and stock maintenance.

Raybro Electric Supplies, Inc., with offices and warehouses in Tampa, Jacksonville, Miami, St. Petersburg, Orlando, and now, Lakeland, will celebrate its 30th anniversary in 1958. Mr. Troy A. Brown, its founder, continues as its very active president. The company maintains an outside sales staff of fifty experienced men covering all of Florida and the southern section of Georgia.

GE CAPACITOR PLANT—Production of aluminum and tantalum electrolytic capacitors for radio, television, military electronic and other communications equipment has begun at this new General Electric plant at Irmo, S. C. The building is windowless, and temperature and humidity are rigidly controlled to satisfy manufacturing requirements peculiar to electrolytic capacitors—tubelike devices which store electric energy.

Sales conference held by Holophane

THE ENTIRE STAFF of field representatives from all over the United States and from Canada and Mexico attended the recent General Sales Conference of the Holophane Co., Inc. Held at Bear Mountain Inn, Bear Mountain, New York, the program included several sales analysis sessions and product seminars and concluded at the Light and Vision Institute at the Holophane headquarters in New York City.

Among those attending from the Southern and Southwestern states were: E. Mark Smith, Jr., district engineer, Mississippi, Louisiana and Arkansas; E. C. Gatewood, district engineer, North and South Carolina; Judd Lough, district manager, Georgia, Alabama and Tennessee; C. A. Patterson, district manager, Southern Texas; W. G. Campbell, district engineer, Northern Texas and Oklahoma.

Representatives from the Southern states attending the Holophane Company's General Sales Conference at Bear Mountain, New York included (from left to right) E. Mark Smith, Jr., New Orleans; E. C. Gatewood, Charlotte, N. C.; Judd Lough, Atlanta; C. A. Patterson, Houston, and W. G. Campbell, Dallas.

Brief news notes of manufacturers

THE PLASTIC WIRE & Cable Corp., of Jewett City, Conn., manufacturers of a complete line of insulated wire, cable, and cord sets, have announced the appointment of Edgar E. Dawes & Co., of Atlanta, Ga., as their Southeastern sales representative.

* * *

ALLIS-CHALMERS Manufacturing Co. has named the Besco Electric Supply Co., of 711 South 14th St., Leesburg, Fla., as distributor for transformers in Leesburg, St. Cloud, and to electrical contractors in Lake County, Fla. The firm is headed by Robert M. Braun.

* * *

MEIER ELECTRIC and Machine Co., Inc., has announced the opening of a regional sales office in Chattanooga, Tenn., to better serve the electric heating market in the Tennessee Valley area.

* * *

COLUMBIA CABLE & Electric Corp. has announced that their underground feeder cable has now been listed by Underwriters' Laboratories in sizes #2 Stranded to 4/0.

* * *

A. B. CHANCE Company opened the doors of their Centralia, Mo., factory and general offices recently for an Open House celebration of the 50th Anniversary of the firm. The Chance anniversary coincided with Centralia's Centennial Celebration.

Major appointments made at Anaconda

ANNOUNCEMENT has been made of the appointment of L. F. Hicker-

nell as vice-president of engineering of Anaconda Wire & Cable Co In his new post, Mr. Hickernell will have full responsibility for directing the engineering, as well as the research and development activities of the company.

A graduate of Grinnell College, AB 1920, and also of M.I.T., BS in Electrical Engineering, class of 1922, Mr. Hickernell is a fellow and director of the AIEE, and has been a contributing editor to the Standard Handbook for Electrical Engineers. He joined Anaconda in 1931.

Leonard L. Carter has been named chief engineer of the company and will act in a general executive capacity over all activities of the engineering department. Mr. Carter joined Anaconda Wire

L. F. Hickernell

& Cable Company in 1932. He is a graduate of Purdue, and holds an MS degree from the same university.

Henry V. Van Valkenburg has been elevated to the post of gen-

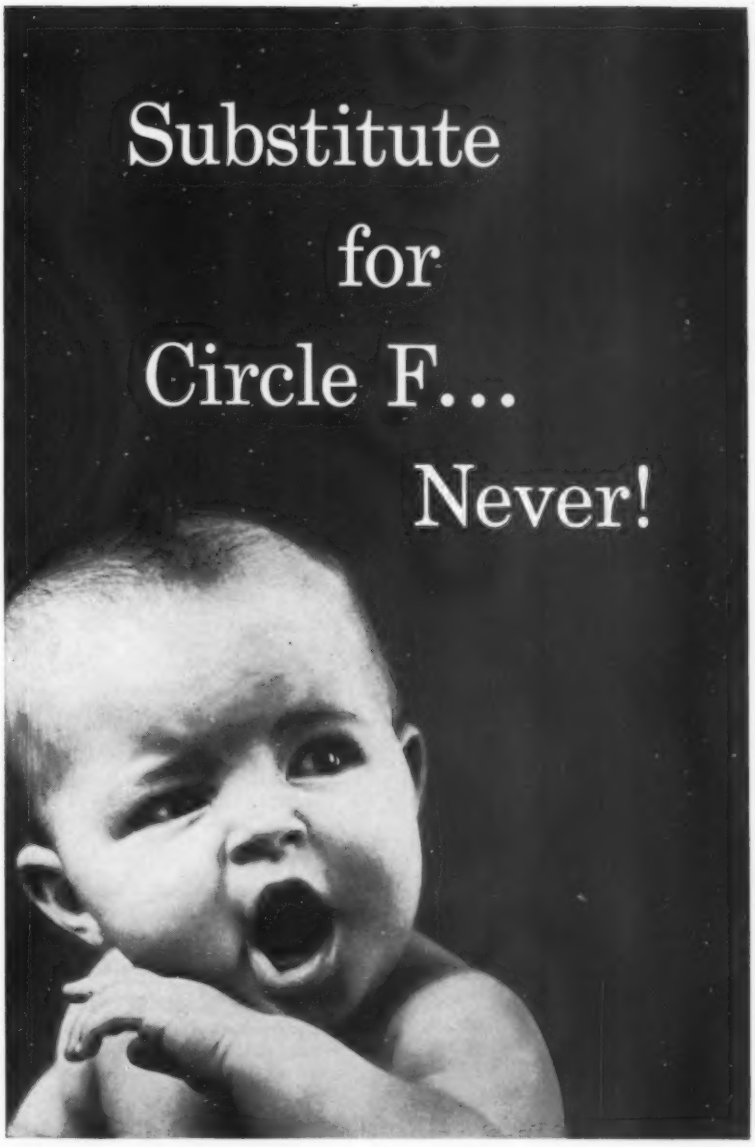
L. L. Carter

eral sales manager from the position of sales manager.

David T. Werner, now district manager, Charlotte, N. C., is named manager of the company's southern plant to be located at Watkinsville, Ga.

Jackson B. West of the Charlotte office has been elevated to district manager of Charlotte, replacing Mr. Werner.

Max Rubenstein, presently dis-



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For your wire requirements: Eastern Insulated Wire Corp.
Box 591, Trenton, N. J.
A Subsidiary

trict manager, Washington, D. C., is appointed manager of sales-governmental agencies, with headquarters in Washington.

Stultz elected president of Potomac Edison

D. E. STULTZ was elected president of the Potomac Edison Company to succeed R. Paul Smith, at a recent meeting of the Board of Directors.

For the past four years Mr. Stultz has been serving as executive vice-president of his company and, as a result, brings to his new position broad experience and an intimate knowledge of the chief executive's responsibilities.

Mr. Stultz has been involved in practically all phases of the utility business over a period of thirty-eight years. His first employment in this field was in 1919 in his native town of Frederick, Maryland. In that year he went to work for the Hagerstown and Frederick Railway Co., a predecessor company of the present Potomac Edison System.

Retirement of R. Paul Smith from the presidency climaxes nearly fifty years of service with the company and its predecessors. For the past twenty-five years, he has

Dates Ahead

Illuminating Engineering Society, National Technical Conference, Biltmore Hotel, Atlanta, Ga., Sept. 9-13.

Southeastern Electric Exchange, Engineering and Operation Section, Atlanta Biltmore Hotel, Sept. 19-20.

National Rural Electric Cooperative Assn., Region VIII, Jung Hotel, New Orleans, La., Sept. 19-20, 1957.

Public Utilities Assn. of the Virginias, 39th Annual Meeting, Greenbrier Hotel, White Sulphur Springs, W. Va., Sept. 20-21, 1957.

Industrial Electronics Conference, 6th Annual Symposium, Morrison Hotel, Chicago, Ill., Sept. 24-25, 1957.

Edison Electric Institute, Meter and Service Committee, Hotel Nicolet, Minneapolis Minn., Sept. 24-26, 1957.

Edison Electric Institute, Electrical Systems and Equipment Committee, Cosmopolitan Hotel, Denver, Col., Sept. 30-Oct. 1, 1957.

National Assn. of Corrosion Engineers, South Central Region Meeting, Oklahoma City, Okla., Oct. 1-4, 1957.

International Assn. of Electrical Leagues, Annual Conference, Sheraton-Gibson Hotel, Cincinnati, Ohio, Oct. 2-5, 1957.

American Institute of Electrical Engineers, Fall General Meeting, Chicago, Ill., Oct. 7-11.

National Rural Electric Cooperative Assn., Region III, Admiral Semmes Hotel, Mobile, Ala., Oct. 13-14, 1957.

Southern Section, IAEI, Annual Meeting, Dinkler Plaza Hotel, Atlanta, Ga., Oct. 14-16, 1957.

Georgia Chapter, IAEI, Annual Meeting to be held with Southern Section Annual Meeting, Dinkler Plaza Hotel, Atlanta, Ga., Oct. 14-16. Business session 4:30 p.m., Oct. 14.

Southeastern Electric Exchange, Sales Conference, Tutwiler Hotel, Birmingham, Ala., Oct. 16-18.

National Rural Electric Cooperative Assn., Region II, Henry Grady Hotel, Atlanta, Ga., Oct. 17-18, 1957.

Florida Assn. of Electrical Contractors, Annual Convention and Trade Show, Soreno Hotel, St. Petersburg, Fla., Oct. 16-19, 1957.

Edison Electric Institute, Transmission and Distribution Committee, Statler Hotel, Boston, Mass., Oct. 17-18, 1957.

Oklahoma Utilities Assn., Electric Light and Power Division, Western District Conference, Woodward, Okla., Oct. 24, 1957. Eastern District Conference, Bartlesville, Okla., Oct. 25, 1957.

Tenth Annual Power Distribution Conference, University of Texas, Austin, Texas, Oct. 28-30, 1957.

National Rural Electric Cooperative Assn., Region X, Baker Hotel, Dallas, Tex., Nov. 7-8, 1957.

Institute of Radio Engineers, Annual Instrumentation Conference and Exhibit, Biltmore Hotel, Atlanta, Ga., Nov. 11-13, 1957.

National Electrical Manufacturers Assn., Annual Meeting, Traymore Hotel, Atlantic City, N. J., Nov. 11-15, 1957.

National Electrical Contractors Assn., Annual Convention, Cincinnati, Ohio, Nov. 13-16.

American Institute of Electrical Engineers, Sixth Annual Textile Applications Conference, North Carolina State College, Raleigh, Nov. 14-15, 1957.

Southeastern Electrical Wholesalers Assn., 8th Annual Industry Day Meeting, Biltmore Hotel, Atlanta, Ga., Jan. 29-31, 1958. M. L. Tice, Exec. Vice-Pres., P. O. Box 176, Ben Hill Station, Atlanta 11, Ga.

American Institute of Electrical Engineers, Winter General Meeting, Hotel Statler, New York, N. Y., Feb. 2-7, 1958.

Oklahoma Utilities Association, Annual Convention, Biltmore Hotel, Oklahoma City, March 27-28, 1958.

American Institute of Electrical Engineers, Southwest District Meeting, Tulsa, Okla., March 31-April 2, 1958.

American Institute of Electrical Engineers, Middle Eastern District Meeting, Washington, D. C., April 28-30, 1958.

American Institute of Electrical Engineers, East Central District Meeting, Huntington, W. Virginia, May 13-15, 1958.

D. E. Stultz

held the position of president of The Potomac Edison Co., South Penn Power Co., Northern Virginia Power Co., and the Potomac Light and Power Co., the companies which make up the Potomac Edison System.

His association with the utility business began in 1909 when he was employed as secretary to the manager of the Washington, Frederick and Gettysburg Railroad, one of Potomac Edison's "ancestor" companies. In 1922, the railway became the Potomac Public Service Company and Mr. Smith was named its general manager. The following year the present Potomac Edison Company was formed and the first unit of what is now the R. Paul Smith Generating Station at Williamsport, Md., was installed.

The Southern Company elects new officers

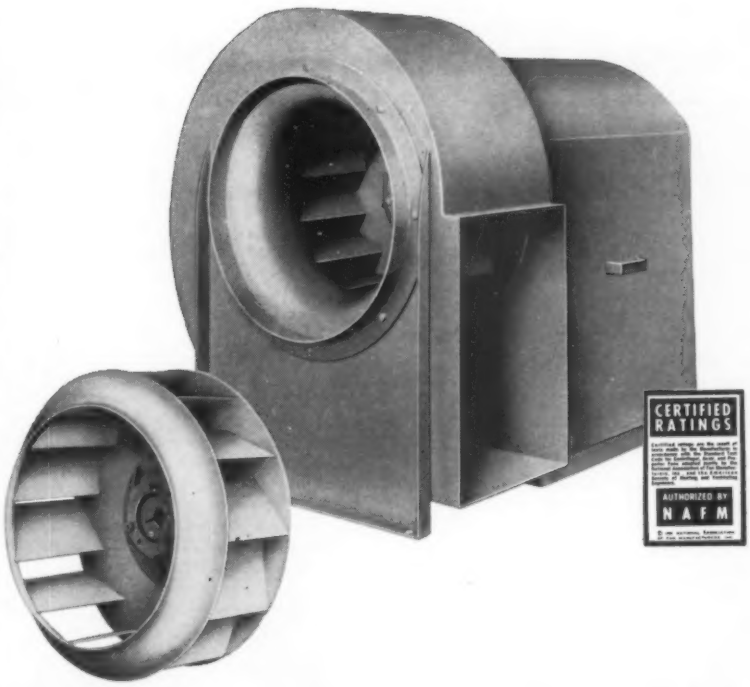
JOHN J. MCDONOUGH, president of Georgie Power Co., Atlanta, was elected a director of The Southern Co. at a meeting of the board here Monday.

James H. McGuire, assistant to the president of The Southern Co., was elected a vice-president.

A quarterly dividend of 27½ cents per share on Southern's common stock, payable Sept. 6 to stockholders of record Aug. 5, was declared.

Other changes in The Southern Co. organization, approved by the directors were as follows:

L. H. Jaeger, secretary and treasurer, was elected vice-president and treasurer; D. B. Peck, assistant secretary and assistant treasurer, was elected secretary; and George B. Campbell, senior engineer of Southern Services, Inc., the service organization of the Southern system, was elected assistant secretary and assistant treasurer. Mr. Jaeger and Mr. Peck will be transferred from Southern's New York office to Atlanta, and Mr. Campbell will be transferred from Birmingham to Atlanta.



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News about people

The election of **John J. Doyle** as vice-president in charge of sales was announced yesterday by Paul B. Murray, president, **Murray Manufacturing Corp.**, Brooklyn, N. Y., makers of residential service entrance equipment.

Mr. Doyle joined Murray in 1936. After several years in the accounting and production departments, he was made production superintendent. He was later made plant manager in charge of all plant production and in 1953, moved into sales as marketing manager. Mr. Doyle is a graduate of Place College and studied electrical engineering at Pratt Institute.

Edwin W. Kenefake has been named sales manager for power line carrier current equipment of the Communication Products Department of the **General Electric Co.**

In his new position, Mr. Kenefake will be responsible for marketing radio equipment which sends signals along existing power lines of utility companies for voice communication and control functions.

Mr. Kenefake formerly was microwave sales manager for the department and has more than two decades of engineering and marketing experience in the communication field.

Before he became associated with the marketing aspects of the company's communications business, Kenefake obtained eight patents on various devices he developed as a design engineer.

Born in Robinson, Ill., Mr. Kenefake is an alumnus of the University of Notre Dame. He received his Bachelor of Science degree in Electrical Engineering there and, while working for his Master's degree, served on the university's faculty.

Announcement has been made by **BullDog Electric Products Co.**, of the assignment of **Charles E. Moran** to the post of supervisor of sales and product training.

Mr. Moran joins BullDog with over ten years of experience in management development and supervisory training. He was previously employed by New York State Gas and Electric Co., the Ford Motor Co., L. A. Young Spring and Wire Corp., and Frigidaire Sales Corp. He majored in Business Administration at Syracuse University and the University of Alabama.

Announcement was also made of the promotion of **Hugh V. Diamond** to the position of sales service manager.

Mr. Diamond joined BullDog in 1951 as an application engineer. Prior to his present appointment, he was sales and product counselor. He is an electrical engineering graduate of Lawrence Institute of Technology.

Moe Light, a division of Thomas Industries, Inc., has announced the promotion of two sales representatives to divisional sales managers. **John Norbert** has been promoted to sales manager of the Midwestern Division and **Charles Cockrill** has been promoted to sales manager of the Southeastern Division.

Mr. Norbert started with Moe Light as a sales correspondent at the Fort Atkinson, Wisconsin, factory and was promoted to district manager of

John Norbert **Charles Cockrill**

the Kansas City territory in 1953. He will headquarter in Kansas City and his division will include South Dakota, Minnesota, Iowa, Nebraska, Kansas, Oklahoma, Arkansas, Texas, Louisiana, and parts of Mississippi and Missouri.

Mr. Cockrill joined Moe Light in 1954 as Washington (D.C.) district manager. He will now headquarter in Atlanta, Ga., where he will open a new divisional office covering Virginia, North and South Carolina, Georgia, Alabama, Tennessee, Florida, and Kentucky.

B. H. Boatner has been elected vice-president of **Westinghouse Electric Supply Company** and general manager of the firm's apparatus and supply division, John F. Myers, president, announced recently.

Mr. Boatner is a native of Marietta, Ga., and was graduated from the Georgia School of Technology in 1928 with a bachelor of science degree in electrical engineering. He joined Westinghouse Electric Corporation at East Pittsburgh soon after graduation and entered the sales field in 1929.

W. M. O'Connor has been appointed manager of the Amarillo District of **Allis-Chalmers Industries Group.** Mr. O'Connor, who joined Allis-Chalmers in 1942, had been a sales representative in the company's Houston District in recent years. He is an electrical engineering graduate of Rice Institute.

In his new post, Mr. O'Connor succeeds **J. C. Lovelace**, who will become manager of the St. Louis district. Mr. Lovelace came to Allis-Chalmers in 1942 and was assigned to the Amarillo office in 1944. He had been manager there since 1954. He is a mechanical engineering graduate of Texas Technological College.

Announcement has also been made of the appointment of **W. E. Korsan**, formerly manager of the St. Louis District, as manager of sales of the company's Electrical Application Department.

Mr. Korsan joined Allis-Chalmers in 1942 and was a representative in the Memphis office before being assigned to St. Louis in 1945. He was named St. Louis district manager in 1955. Mr. Korsan is an electrical engineering graduate of the University of Wisconsin.

Cornell-Dubilier has announced the appointment of **Robert Arany** as sales manager of its Power Factor Capacitor Division. Mr. Arany has been with the Cornell-Dubilier Electric Corporation for the past seventeen years. He started with the firm as a draftsman in 1940 and was promoted to sales correspondent in 1941. After three years of service in the Air Force during World War II, he returned in 1946 as assistant to the sales manager.

Joseph H. Williams has been appointed advertising and sales promotion director of the **Benjamin Electric Mfg. Co.**, Des Plaines, Ill., manufacturers of industrial and commercial lighting equipment, and audible signal equipment. Mr. Williams for twenty-one years was general advertising manager of the Sangamo Electric Co. Mr. Williams' appointment is in accordance with the Benjamin's planned program of increased and expanding advertising and marketing activity.

Announcement has been made of the appointment of **Edward T. Corbus, Jr.**, as sales manager of **Gedney Electric Co.**, of New York, manufacturer and marketer of electrical fittings.

Previously associated with U. S. Rubber Co., Mr. Corbus was assistant sales manager of the corporation's Electrical Wire and Cable Division when it was taken over in February

Edward T. Corbus

of this year by Kaiser Aluminum and Chemical Sales, Inc. For several months he held a similar position with the Insulated Products Division of the Kaiser organization. Mr. Corbus is an alumnus of the University of Michigan, receiving a bachelor of arts degree in 1928.

A. H. Herrmann, public relations consultant of **Virginia Electric and Power Company** and an employee of the firm and its predecessors for 47 years, has retired. Mr. Herrmann joined the Virginia Railway and Power Company in 1910 as secretary to its first president.

Later he became assistant to the president and was named secretary of the company in 1920.

He became public information director in 1925 when the company's name was changed to Virginia Electric and Power Company. He continued as public information officer until last year when he was named public relations consultant.

Andrew J. Haswell was elected a vice-president of **Oklahoma Gas and Electric Company** by the board of directors at its reorganization meeting recently following the annual stockholders meeting. All other officers of the company were reelected.

Andrew J. Haswell

Joining OG&E in 1923 as a mail boy while a student at Central High School, Mr. Haswell worked part-time for the company while attending Oklahoma University, and graduated with a bachelor of science degree.

Mr. Haswell has held positions as division accountant, division auditor, and most recently as director of personnel administration. Under his leadership a training and safety program was developed which was instrumental in making OG&E rank third in the nation among all public utilities of its size in the prevention of accidents. The company's accident frequency in 1956 was 75 per cent lower than the national average among electric companies.

John F. Pennington, vice-president in charge of operations of **Georgia Power Co.,** has been named vice-president in charge of engineering and operations, John J. McDonough, president, announced recently.

J. F. Pennington

In his new position Mr. Pennington will assume additional duties resulting from the retirement of Ray N. Benjamin, vice-president and chief engineer.

Mr. Pennington will also have supervision of the company's land, purchases and stores, fuel supply, and claim departments.

He joined the company as a construction helper in 1918. He is a native of Hartwell, and attended public schools in Raeford, N. C.

Fred R. Opie, an application engineer in **Allis-Chalmers** switchgear department since 1955, has been assigned as a sales representative to the company's Louisville district office.

Opie is a mechanical engineering graduate of the University of New Hampshire and joined Allis-Chalmers in 1953.

The election of **J. A. Petty** to the board of directors of the **Southwestern Gas and Electric Company** was announced recently in Shreveport by J. Robert Walsh, president. Mr. Petty has been division manager for Mt. Pleasant since 1936 and is a veteran of thirty-eight years service with the company.

Willard E. Henges, president of the **Graybar Electric Co., Inc.,** announces the following appointments and transfers in district personnel.

H. G. Cook, Wolverine district manager becomes Mississippi Valley district manager at St. Louis.

Mr. Cook joined Graybar in 1920 at Grand Rapids as a part-time messenger. Since 1922, as a full time employee he has held such positions as order editor, counterman, and operating manager. In 1939, he became branch manager of that location. In 1955 he transferred to Detroit as district manager, the position held until his present transfer.

W. B. Whaley becomes assistant district manager at Kansas City, Mo. Mr. Whaley joined Graybar as a student at Richmond in 1936. In 1937 he entered the credit department where he remained until joining the service in 1943. In 1946 upon his return, he transferred to Chicago as creditman, and in 1949 became district credit manager at Jacksonville. In December 1952 he transferred to Kansas City in the same capacity.

R. B. Sayre, vice-president of Graybar, announced that **C. C. McGraw,** Omaha branch manager, becomes manager, supply sales at Houston.

Mr. McGraw joined Graybar in 1936 at Birmingham in the stock maintenance department. In 1939 he transferred to the Knoxville sales department, and in the same year became combination salesman. He was promoted to sales manager of the Chattanooga branch in 1940. In 1942 he left for military service, and rejoined Graybar as manager of the inside wiring department in Atlanta in 1945. He became manager of the Savannah branch in 1947; a year later, he transferred to Knoxville in the same capacity. In 1954 he was again transferred, to Omaha, where he served as branch manager until his recent appointment.

F. E. Gibson, treasurer of the Graybar Electric Co., Inc., announces the following transfers in district financial personnel.

W. R. Pearson, district financial manager at St. Louis, transfers to Kansas City. Mr. Pearson joined Graybar as a financial student at Kansas City in 1940. He has held such positions as creditman and teller, procurement expediter, office salesman; in 1950 he transferred to Denver as credit manager. A year later he moved to Houston as district credit manager for the Gulf Coast

district. He was appointed district financial manager at St. Louis in 1955, the position held until his present transfer.

T. W. McLaughlin, district financial manager at Minneapolis, transfers to St. Louis in the same capacity.

Mr. McLaughlin joined Graybar as a warehouseman at Seattle in 1948. The same year he transferred to the credit department. In 1950 he transferred to Portland, Oregon as branch financial manager. He became district financial manager at Minneapolis in 1955.

The appointments of **B. J. Snow** as area sales manager in the Dallas office and **H. E. Six** as area sales manager in St. Louis were recently announced by the **Westinghouse Electric Corp.**

Mr. Snow started with Westinghouse in 1937 on the Graduate Student Training Course in Pittsburgh, Pa. A native of Topeka, Kansas, Mr. Snow attended Topeka High School and later received a degree in electrical engineering from Kansas State College.

Replacing Mr. Snow as area sales manager in St. Louis is H. E. Six, who is a nine year veteran with Westinghouse. A graduate of the U. S. Naval Academy, Mr. Six continued his education at St. Louis University receiving his LLB degree in 1953.

James L. Stanton

James R. Stanton has been added to the Florida sales staff of **Nutone, Inc.,** according to an announcement by **L. B. Dreifus,** vice-president and eastern sales manager for Nutone.

Mr. Stanton, who will operate out of Orlando, is Nutone's fourth salesman in the Florida area, all operating under Manager Ed McKay, who headquarters in Tampa.

Robert L. Bobo has been appointed general sales manager for **Federal Pacific Electric Co.,** according to an announcement by R. C. Graves, vice-president of sales. Mr. Bobo was previously Great Lakes regional sales manager, stationed at Cleveland, Ohio.

Mr. Bobo joined Federal Pacific in 1954 from Westinghouse Electric, where he was manager of the Switchgear Assemblies Sales Section of the Switchgear Division. From March, 1952, through June, 1953, he was on loan from Westinghouse to the U. S. Department of Commerce, serving as chief of the National Production Authority's Switchgear and Transformer Section.

An electrical engineer, Mr. Bobo received his degree in 1940 from Oklahoma A & M. He will exercise his new marketing responsibilities for all product groups from Federal Pacific's executive headquarters at 50 Paris Street, Newark, N. J.

R. H. Jackson, Southeastern District manager of **General Electric Company's** newly organized User Industry Sales Department has announced appointment of six new managers.

G. E. Hoopingarner, industrial sales engineer in Mobile, Alabama since 1952, was named district product sales manager. His new headquarters will be in Atlanta. An electrical engineering graduate of Tri-State College, Angola, Indiana, he joined General Electric in 1942.

Appointed as manager of utility sales for Alabama and Georgia was

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tising, apparatus and defense adver-

John C. Ager, who has been Georgia manager of User Industry Sales. Mr. Ager, a 1940 graduate of Duke University with a degree in electrical engineering, joined GE in 1946.

James L. Townsend, district manager of advertising and sales promotion, was appointed manager of Industry Sales for Georgia and Florida. He has been with GE for thirty-two years.

H. B. Greear, senior district application engineer, was appointed district manager of application engineering with headquarters in Atlanta. A veteran of thirty-five years with General Electric, Mr. Greear is a graduate of Virginia Polytechnic Institute.

J. W. Stone, district lighting specialist, has been named district manager of marketing research. Stone is a 1948 graduate of the University of Alabama, and served in various GE locations before coming to Atlanta in 1956.

R. L. Buchanan, sales promotion specialist, is the new Southeastern District manager of sales promotion, with headquarters in Atlanta. A native of Geneseo, New York, he is an electrical engineering graduate of Union College, Schenectady.

The appointment of **Dewey A. White** as regional sales manager of **The Okonite Company,** manufacturers of insulated wire and cable, has been announced by Charles M. Kirkland, vice-president in charge of sales.

Mr. White, district manager of the company's Birmingham district since 1941, will now supervise the activities

Dewey A. White

of the Birmingham, New Orleans and Dallas districts. He will work closely with **I. W. Borda,** recently named vice-president and general sales manager, to strengthen communications between headquarters and the expanded sales force.

Now observing his 30th year of company service, Mr. White received his education at Georgia Institute of Technology.

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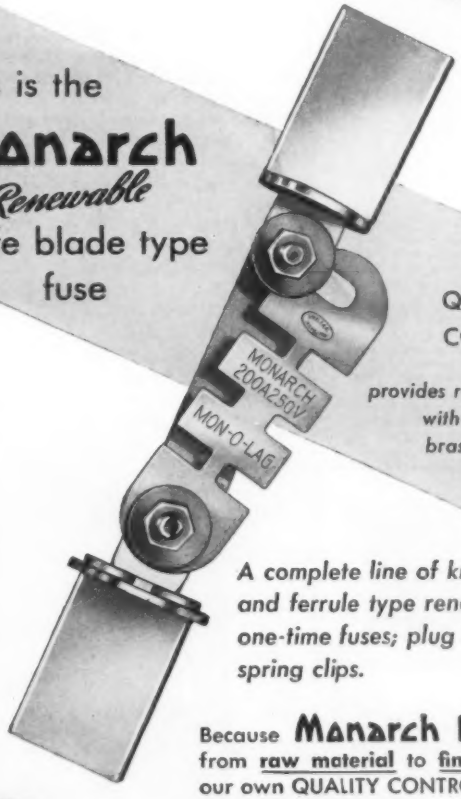

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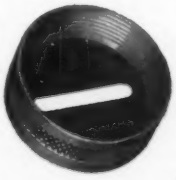

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Douglas B. Clark

The Large Lamp Department of **General Electric Company** has announced the appointment of **Douglas B. Clark** as manager for the new regional sales office in Atlanta. He will be responsible for seven lamp sales districts, with headquarters in Memphis, New Orleans, Atlanta, Tampa, Charlotte, Richmond, and Baltimore.

Mr. Clark is a native of Sumrall, Mississippi and has worked for General Electric for twenty-eight years. For the eight years prior to his appointment as regional manager, he was sales manager for the Florida District.

Jesse T. Wright, Jr., has been appointed sales representative in North Florida for **Suchman and Coulter, Inc.,** factory sales agents of electrical

Jesse T. Wright

products, with home offices in Miami. Mr. Wright will make his headquarters in Tampa where **Morris Acton** is in charge of the new Suchman and Coulter warehouse.

J. H. Jewell, vice-president of marketing, has announced the appointment of **Roger H. Bolin** as director of advertising for **Westinghouse Electric Corporation.**

Mr. Bolin, formerly manager of general advertising for the company, will direct general products advertising, apparatus and defense advertising, and general advertising at Pittsburgh headquarters. In addition he will maintain staff supervision over the advertising departments of Westinghouse divisions. The position of director of advertising is a newly created one with the company.

A native of Brazil, Ind., Mr. Bolin was graduated from Rose Polytechnic Institute, Terre Haute, with a bachelor of science degree in electrical engineering.

H. Baldwin has been appointed sales manager of **Clifton Conduit Corporation** at Baltimore, Maryland a division of General Cable Corporation, manufacturing rigid, EMT and flexible conduit.

Mr. Baldwin has been associated in the sales and manufacturing of the electrical industry for the past fif-

H. Baldwin

teen years and most recently, as sales representative in the New York sales office of the General Cable Corporation.

John H. Max has been appointed Atlantic region sales manager for the **Westinghouse** Lamp Division, it was announced by **Robert D. Barr,** general sales manager for the division. Mr. Max succeeds **Gordon W. Howson** who has been transferred to the division headquarters sales staff in Bloomfield, N. J.

In his new position Mr. Max will direct Westinghouse lamp division activities in half of Pennsylvania, parts of New Jersey, West Virginia, Kentucky, Tennessee and North Carolina, and all of Delaware, Maryland, Virginia, and the District of Columbia. He will make his office at 3001 Walnut Street in Philadelphia.

John B. Crosby, formerly advertising manager of **Crouse-Hinds Co.,** Syracuse, N. Y., has been promoted to the newly created position of assistant to the president, according to **John R. Tuttle,** chairman of the board and president of Crouse-Hinds,

Technical book

The eight co-authors, members

manufacturer of condulets, floodlights, airport lighting, traffic signals, and explosion-proof electrical equipment.

Succeeding Crosby will be **Cornell B. Blanding,** previously coordinator of the product research and development committee working with engineering and sales.

Mr. Crosby is a graduate of the U. S. Naval Academy and has been

Cornell B. Blanding

with Crouse-Hinds 15 years, having begun his career with the company in condulet sales.

Mr. Blanding joined the company's insurance department in 1951, subsequently becoming department manager. He has been responsible for several outstanding programs in safety and fire protection.

Gordon E. Granger, Jr. has been appointed manager of the Virginia Branch of **Federal Pacific Electric Co.,** according to an announcement by **H. E. Knudson,** Middle Atlantic regional sales manager.

An electrical engineering graduate of Pennsylvania Military College, Mr. Granger began his career in the electrical industry with the Rumsey Electric Co. In 1952 he joined Federal Pacific as a sales engineer in the Richmond territory, and was later put in charge of the company's Norfolk sales operation. His new duties include direct service responsibility for the Virginia Electric & Power Co.

Gordon E. Granger

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Now, a special Directory for the use of the Southern and Southwestern electrical trade has been published by ELECTRICAL SOUTH.

This Directory of Electrical Manufacturers and their Southern and Southwestern Representatives has been a "smash hit" because it fills a long felt need. The tremendous increase in electrical business in the South in recent years has led many more electrical manufacturers to establish representation in this fast growing area. These representatives offer valuable services to the electrical wholesalers and the electric utility companies, as well as other branches of the electrical industry.

In compiling this Directory, we have endeavored to furnish the most complete listing possible of all electrical manufacturers in alphabetical order together with their Southern and Southwestern representatives.

For convenience, a number of manufacturers have included cross-reference advertising on their products. This extra service will help locate special facts and specifications and other pertinent product data.

So far as we know, this is the first Directory of its kind ever published for the Southern electrical trade.

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Technical books

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Heating guide book

"1957 Heating, Ventilating and Air Conditioning Guide," Thirty-fifth Edition. Published by the American Society of Heating and Air-Conditioning Engineers, 62 Worth St., New York 13, N.Y., inlustrated, $12.00.

Of particular interest in the greatly revised and expanded 1957 Guide is the technical data section which has enlarged its reference material on manufacturers.

A new set of U-value tables cover many more constructions and are accompanied by calculations and explanations of how to relate U-values to changes in construction and materials.

A chapter on industrial environment has been added which gives particular attention to heat stress and methods of controlling heat exposure.

Other improvements in the guide include: a new presentation for the design of hot water heating systems; a step-by-step procedure for designing ceiling and floor heating panels; instructions for pipe and industrial insulation; extended text and diagrams for district heating; and discussion of corrosion causes and prevention.

Much of the information was made possible through work conducted at the ASHAE Research Laboratory, Cleveland, Ohio, under the guidance of the Society Committee on Research and with the assistance of numerous ASHAE Technical Advisory Committees.

Transistor circuits

"Transitor Circuit Engineering," edited by Richard F. Shea. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y., 468 pages, illustrated, $12.00.

The eight co-authors, members of the Advanced Circuits Subsection of the Electronics Laboratory of General Electric, prepared this book to show how transitor theory can be put to work in typical circuits. It provides all necessary tools for doing actual circuit designs and developing usable circuits in all potential fields of application.

It enables the reader to build successful audio amplifiers, radio frequency amplifiers, etc., using available transistors. Moreover, it shows him how to combine these elements into radio receivers, television sets, and high fidelity audio systems.

In addition, this work gives up-to-date information on the development of new devices and their application in broad new fields.

Engineering handbook

"Standard Handbook for Electrical Engineers," Ninth Edition, prepared by staff specialists of Electrical World, edited by Archer E. Knowlton. Published by McGraw-Hill Book Co., 327 West 41st St., New York 36, N. Y., 2311 pages, illustrated, $19.50.

The considerably revised handbook incorporates important facts and data from all the vast changes and developments in materials, methods, and applications that have taken place during the eight years since the last edition.

The book is an encyclopedia of facts and figures, definitions, conversion factors, physical and mathematical principles, accepted formulas, experimental data, etc., presented in compact, easy-to-use form.

More than 100 engineers, scientists, and other authorities have contributed to this giant reference guide of the electrical industry. Among the subjects covered are communication (wire and radio), transportation (air, land, and sea), electric heating (including welding), electrochemistry (including batteries), illumination, nuclear power, elevators and mine hoists, lightning protection and power plants (transmission, distribution, and instrumentation and control).

The extensive revision of the book in this edition includes new or enlarged sections on such subjects as the transistor, nuclear power, new dielectrics for capacitors, many new synthetic resins and plastics, electrical measurement for automation, new lighting, recent metals like titanium and zirconium, electric conductor tables completely recast on basis on newest ASTM standards, 12-volt automotive system, new power

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cables, highest transmission voltages, telemetering, new international electrical units and values, and magnetic amplifiers in motor control.

Electrical fundamentals

"Learning Electricity Fundamentals," by Leonard R. Crow. Published by Howard W. Sams & Co., Inc., 2201 East 46th St., Indianapolis 5, Ind., 416 pages, $5.95.

Before anyone can hope to understand radio, television, radar, industrial electronics, or any other branch of electronics, he must first master the basic principles of electricity. This book strips electricity of its mysterious sounding terms and explains its character in easy-to-understand words. It will prove equally useful for those who intend to confine their attention to such subjects as the operation and maintenance of electric motors and appliances . . . and the wiring of homes.

"Learning Electricity Fundamentals" clearly presents the basic laws, theories, and practical applications of electricity; operation of a-c and d-c motors; transformers; generators; circuits and controls; practical wiring; etc.

Printed circuits

"Introduction to Printed Circuits," by Robert L. Swiggett. Published by John F. Rider, Inc., 480 Canal St., New York 13, N. Y., 112 pages, $2.70.

A really basic and comprehensive text book on printed circuits, this book gives complete coverage of the processes used for the manufacture of ceramic based, etched, plated, stamped, pressed powder, embossed wiring, double foil and die blanked printed circuits. The book describes the servicing techniques and problems associated with printed circuits.

A full chapter is devoted to the components composed of, and used with, printed circuitry. These include such items as resistors, potentiometers, capacitors, tube sockets, switches, rectifiers, etc. The text and associated illustrations show how these components are combined into a finished product. Another chapter devotes itself to the various types of assembly systems used in mass production of printed circuits and printed circuit devices.

The author, Robert L. Swiggett, is executive vice-president of Photocircuits Corp. He holds a B.A. and a B.S. degree in chemical

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engineering. Mr. Swiggett has had extensive experience in the printed circuit field not only with his present firm but earlier with development engineering for Eastman Kodak Company and Powers Chemco, Inc. His many papers for the technical press have further qualified him to write a definite work on printed circuitry.

Electronics data

"Electronics Reference Data," Published by Howard W. Sams & Co., Inc., 2201 East 46th St., Indianapolis 5, Indiana, 128 pages, $2.00.

This new book will provide a ready reference to the many subjects encountered in the field of electronics. The wide variety and completeness of this data will prove helpful to service technicians, experimenters, students, amateur radio operators, or anyone concerned with the technical side of the electronics industry.

The data presented and illustrated covers the design, application, and theory of operation of many TV circuits; various oscillator circuits; waveforms and wave shaping; meters and measurements; and covers specialized application and development of such equipment as Gieger counters, photoelectric cells, printed circuits, citizens radio service, etc. The characteristics and proper uses of various components used in electronics is also given. Other equally valuable subjects are treated—including elementary binary arithmetic.

Recorder service manual

"Automatic Record Changer and Tape Recorder Service Manual, Volume 9." Published by Howard W. Sams & Co., Inc., 2201 East 46th St., Indianapolis 5, Indiana, 256 pages, $3.95.

This volume presents complete service information on fourteen tape recorders and four record changers produced in 1956. Presented on each recorder and changer are the exclusive copyrighted "Photofact Exploded Views," operational data, and detailed service instructions originated by the Howard W. Sams engineering staff.

The index lists all models which were presented in the first eight volumes as well as those covered in Volume 9. Thus, reference to this index will disclose which volume in the series contains the desired information.

New products

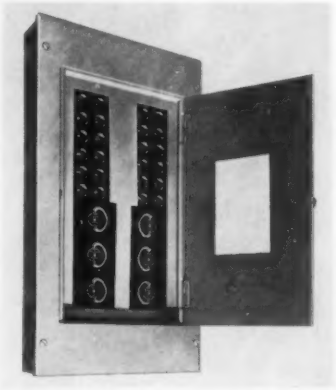
Service entrance switch for electrically-heated homes

A NEW service entrance switch with six pullouts and 24 plug fuse circuits, designed especially for electrically-heated homes, is available from the Clark Controller Co., 1146 East 152nd St., Cleveland 10, Ohio.

Use of the switch permits combining all home service entrance equipment in a single compact cabinet, reducing space requirements and installation costs, and preventing a cluttered appearance at the service entrance.

The switch has a 200-amp rating, and is designed for 120-240 volt installations. Four pullouts accommodate 60-amp cartridge fuses, and two accommodate 30-amp fuses.

To protect against accidental overfusing, the 60-amp and 30-amp pullouts cannot be interchanged. The 24 plug-fuse branches provide plenty of circuits for an electrically heated home plus the modern home's high lighting and small appliance load.



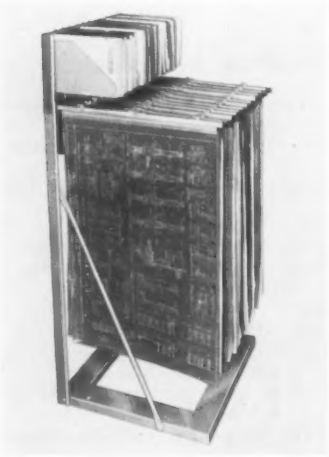
Pullouts are intended to accommodate the branch lighting and heating circuits, a range of either the standard or built-in type, and appliances such as electric water heater, laundry dryer, air-conditioner, built-in oven, water pump, home workshop.

Models are available for either surface or flush mounting. Overall height of the new switch is 28 in. Width is 14½ in., and depth is 3¾ in.

For additional data, ask for item P-836, using the coupon on page 94.

Vertical filing systems for tracings and prints

A VERTICAL data file unit which can be mounted on a rolling stand has been introduced by the Plan Hold Corp., 5204 Chakemco St., South Gate, Calif. Other vertical filing



equipment available includes wall racks, rolling stands, carousel units, filing cabinets, and the Standard Plan Hold which may be used in "homemade" racks. Holes and other mutilations are eliminated with the all-aluminum friction type binders manufactured by Plan Hold Corp.

For additional data, ask for item P-837, using the coupon on page 94.

Grounding connector for transformer tank

A TRANSFORMER tank grounding connector which is cast of high conductivity bronze has been announced by the J. A. Weaver Co., 2110 Howard Street, St. Louis, Missouri. One size connector will handle the full range of grounding conductors from #8 solid to #2/0 stranded. Threads fit all standard EEI-NEMA distribution transformers, and eye-bolt rotates to accommodate conductor in either vertical or horizontal direction. Easily tightened in transformer tank with same wrench used for tightening conductor connector.

For additional data, ask for item P-838, using the coupon on page 94.

Easily-mounted, dry-type distribution transformer

A NEW SERIES of totally sealed, dry-type distribution transformers is announced by Acme Electric Corporation of Cuba, New York, to meet the needs for a single series of transformers with a wide range of outdoor as well as indoor installations.

This new series covers ratings of 5 kva, 7½ kva and 10 kva, single phase 60 cycle; 9 kva and 15 kva 3 phase 60 cycle in all standard voltages of 600 and below.

By using Class H insulation

throughout construction, size and weight per kva have been reduced, the manufacturer claims. While coils are designed to operate in the Class H temperature range, large cooling ducts permit adequate dissipation of generated heat. External case has normal temperature rise of only 40°C.

The manufacturer points out that dust free sealing, eliminates the need for cleaning coils.

Features that will appeal to electrical contractors, and plant maintenance men, are the simplicity by which these units can be mounted with three bolts to beams, columns or walls. Large wiring compartment and knockouts on sides, back and bottom together with solderless, clamp type connectors on a rigid insulating board make connecting easy. No soldering or taping of joints.

For additional data, ask for item P-839, using the coupon on page 94.

Integral distribution center combined in single unit

A SINGLE-UNIT integral distribution center, requiring up to 42 per cent less space than conventional distribution centers, has been announced by the General Electric Specialty Transformer Department, Schenectady 5, N. Y.

The new concept in load centers combines in one piece all three sections necessary for load center applications: incoming line, transformer, and outgoing feeder.

Designed to pass through normal-size factory doors in an upright position, the unit's installed height is 80 inches. For moving purposes the new unit is 78 inches high, because the two-inch high shield over the air vent on top of the center is easily removed. It can be shipped, rolled, and installed in one piece. The distribution center is 37½ to 42½ inches deep, and from 56 to 106 inches wide.

A complete line of integral distribution centers is available in standard ratings of 75-, 112.5-, 150-, and 225-kva. Standard voltage ratings from 208 volts to 15,000 volts are available. The unit's quiet 56 decibel noise level is 10 decibels under NEMA standards for transformers of similar ratings, according to General Electric engineers.

All operations and routine maintenance work can be accomplished from the front of the new center. The center can be installed as close to a wall as local electrical codes permit.

The units are furnished with solderless connectors for incoming and outgoing lines. All lines can be brought in either from the top or bottom of the unit.

Toe or jack space is built in on two sides of the distribution unit for easy jacking. Moving is made easier by elimination of grillwork, louvers, and projecting jacking bosses from the front of the center. Transformers

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THE SOLDERLESS, TAPELESS WIRE CONNECTORS

are approved for 600-V. use

As pressure cable connectors for branch circuit wiring, appliance and machine hook-ups, fixture hanging, etc. (Contractor sizes 74-B and 76-B comply with Sec. 1115, N.E.C.)

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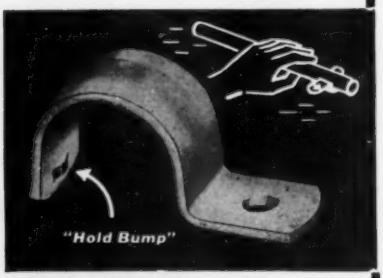
SPEEDS WORK... MORE JOBS, MORE PROFITS—Faster installations mean more profit for installers and their suppliers. The SNAP STRAP *means* faster installations . . . eliminates time-wasting fumbling, dropping, annoyance—all the *temper* is in the SNAP STRAP. Made of heavy gauge steel, zinc plated after fabrication. Wide range of sizes for rigid and thin-wall conduit.



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12661 Brookpark Road • Cleveland 30, Ohio

on all distribution centers above 5-kv are equipped with encapsulated high voltage coils.

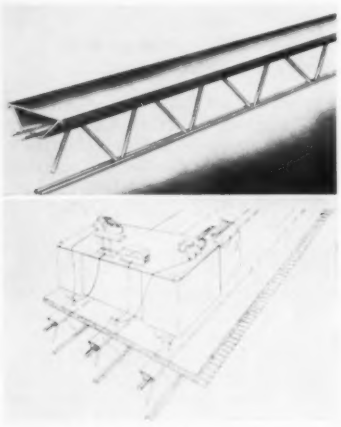
For additional data, ask for item P-840, using the coupon on page 94.

Open-web steel joists contain wiring ducts

ADVANTAGES of underfloor electrification and open-web steel joists are combined in a new product of Ceco Steel Products Corp., 5601 West 26th St., Chicago, Illinois.

Use of the new Ceco electrical-channel joists results in quick and economical construction and provides easy accessibility of signal, telephone and electric wiring concealed in ducts below the floor.

The electro-channel joist is essentially a shortspan open-web steel joist with the conventional top chord replaced by a hollow duct. This



serves both as a structural member and as an underfloor electrical distribution duct. Wiring can be brought up through the floor at any point along the joist where an outlet is needed. When the joists are erected, a smooth unobstructed passageway for wiring exists the full length of the building.

For additional data, ask for item P-841, using the coupon on page 94.

Split-bussing featured in plug-in load center

A NEW LOAD CENTER line featuring "plug-in" operation and split bussing has been announced by Murray Manufacturing Corp., 1250 Atlantic Ave., Brooklyn, N. Y.

Competitively priced and containing from 2 to 42 breaker positions, the new line has many "easy-to-wire" features. Lay-in type connectors facilitate wiring while special "pressure pads" maintain continually tight connections — particularly effective with aluminum conductors. Boxes are available for surface or flush mounting.

For additional data, ask for item P-842, using the coupon on page 94.

Dry-type, single phase distribution transformer

A QUIETER dry-type single-phase distribution transformer (type DS-3) has been introduced by Westinghouse Electric Corp., P. O. Box 2099, Pittsburgh 30, Pa. The new design features reduced sound level, decreased weight and size, and improved appearance.

Availability of this transformer completes a full line of single- and three-phase low-noise-level units. Single-phase ratings are from 25 through 167 kva. Three-phase ratings are from 45 through 300 kva. These designs are available in the 600- and 5000-volt insulation classes.

The new single-phase transformer is designed for quiet operation — 45 db and below for 167 kva and lower ratings in the 600-volt class. The 225- and 300-kva units in the 600-volt class are designed for a level of 50 db or below. Sound levels in the 5-kv class may be slightly higher in some ratings.

Core and coils are mounted on a mechanical vibration dampening system to isolate and reduce the basic sound level and eliminate its transmission, permitting connection of rigid conduit to the case without causing sound transmission through the conduit and mounting equipment. The unit uses a basically inorganic insulation system, including silicone varnishes, and is designed for 150 degrees C temperature rise. Over-all volume is reduced by as much as 11 per cent compared to previous 80 degree C design. Weight reductions range from 8 to 32 per cent.

All terminal boards and cable connections are in a compartment located at the bottom of the transformer where low-temperature conductors

can be used since the air in this area is at ambient temperature. Typical 25-kva unit is 31 in. high, 15 in. wide, 17 in. deep, and weighs only 252 pounds.

For additional data, ask for item P-843, using the coupon on page 94.

Insulated wire and cable resists heat and moisture

NEW TYPE RHH 90°C-RHW 75°C heat and moisture resistant, rubber

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New DESIGN
Modern Streamlined

New COLOR
Tutone Driftwood

New CAPACITIES
3200, 3600, 4800 watts

100% SAFE!

The reason these heaters are so safe to use anywhere from attic to basement is because of the completely sealed-in, cast-aluminum heating element—an Electromode exclusive feature. There are no open wires and no glowing coils, and there is no danger of fire, shock or burn. Equipped with an automatic safety switch and quiet heavy duty motor.

INSTANT HEAT—WHEREVER NEEDED

These powerful new heaters give abundant fan-circulated heat for big rooms, safely and quickly. Enable the family to use the whole house, anytime. Equipped with a 6-foot cord and plug and convenient carrying handle. Built-in thermostat provides automatic room temperature control.

Ideal for use in basement game room, work shop, laundry; expansion attic; cottage; garage; big hard-to-heat rooms.

Electromode's full line consists of heaters for home, farm, industry—in portable, suspension, and wall-type models.

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insulated and fibrous covered wire and cable is now available from National Electric Products Corp., Gateway Center, Pittsburgh, Pa. Designed for general use in wet or dry locations, Type RHH-RHW wire and cable is listed by Underwriters Laboratories, Inc., for 600 volt service in sizes 14 through 6 AWG.

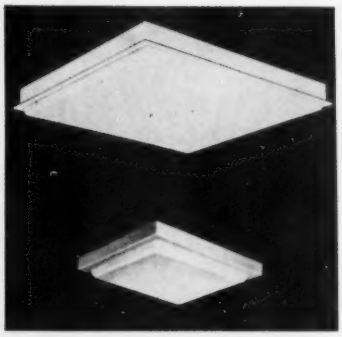
The insulation is Nepcozone Butyl for high voltage cable where its ozone and corona resistant properties are desired. This wire will find application in industrial plants and boiler rooms where heat and moisture may be present and where rubber insulation characteristics may be preferred.

For additional data, ask for item P-844, using the coupon on page 94.

Surface or recessed large area light units

EXTRA SHALLOW large area light sources for surface and recessed mounting, called Baylites, are being manufactured by Electro-Silv-A-King Corp., 1535 S. Paulina St., Chicago 8, Ill.

Both surface and recessed Baylites are two or four-feet squares, and are available with either plexiglass diffuser or styrene louver. The door in which the diffuser is contained can



be removed from the housing, as well as hang for simplified maintenance. The two-foot units are available with four or six lamps, and the four-foot units are available with four, six or eight lamps.

For additional data, ask for item P-845, using the coupon on page 94.

Plastic-enclosed fluorescent unit for corridor lighting

DEVELOPMENT OF a modern plastic-enclosed fluorescent unit, ideal for lighting corridors, pedestrian tunnels and other long, narrow traffic areas, has been announced by Smithcraft Lighting, Chelsea 50, Mass.

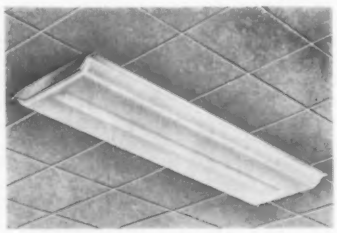
The Smithcraft Freeway has a one-piece extruded polystyrene shielding. This plastic shielding completely encloses the unit, and provides high impact strength and light stability even after prolonged use. Knockouts at the ends of the housing are provided for continuous wiring: end caps fasten together to assure straight, continuous rows.

The one-piece plastic shielding snaps easily in and out of place. The Smithcraft Bonderite and white baked enamel finish on the housing adheres firmly and stays white indefinitely. This finish also provides positive resistance to chemicals and heat, effectively resists abrasions, and reflects a maximum percentage of light.

For additional data, ask for item P-846, using the coupon on page 94.

Two-lamp unit added to Shallorama line

TO EXTEND the range of versatility and flexibility of the magnificent new Shallorama by Sunbeam Light-



ing Co., 777 East 14th Place, Los Angeles, California, this series has been augmented by a two lamp, 13½" wide unit. Designed for surface-mounting with the visual effect of being recessed, this two lamp Shallorama is fully enclosed by contoured matte white Plexiglas for soft, even brightness and efficient "area" illumination. Used in conjunction with the 4-lamp Shallorama, it permits variation in lighting designs and illumination intensities while maintaining comparable styling.

For additional data, ask for item P-847, using the coupon on page 94.

Two-pole molded case circuit breakers

DOUBLE POLE units in both 70, and 100 ampere ratings have been added to the company's Stab-lok line of molded case circuit breakers, according to an announcement by Federal Pacific Electric Co., 50 Paris St., Newark 1, N. J.

Designed for use in any Stab-lok panel, the plug-in breakers are dual rated so that they can be used for both main or branch circuit protection, and thus convert standard Stab-lok load centers into main disconnect panels.

Features include thermal-magnetic action for rapid overload protection; automatic reset that eliminates need

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for relatching; pressure type solderless connectors for simplified aluminum or copper wiring; and common trip action for two-pole disconnect when short or overload occurs through either pole. The breakers are supplied with heavy duty contacts and four-way stabs for two-pole position in any Stab-lok panel.

For additional data, ask for item P-848, using the coupon on page 94.

Explosion-proof plugs and receptacles

A NEW section has been added to the catalog of electrical fittings and fixtures, to cover the new line of plugs and receptacles now being offered by The Killark Electric Manufacturing Co., Easton and Vandeventer Ave., St. Louis, Mo.

The product is available in two basic designs: for explosion-proof installations and for weatherproof installations. Both styles are constructed of rigid, lightweight, rust and corrosion-resisting Killark Alumalloy.

In the explosion-proof plugs and receptacles this non-sparking metal is particularly important as a safety feature. The plug striking against the receptacle housing cannot produce a spark.

In the weather-proof design, special clamp nut arrangement squeezes neoprene bushing around cable to make it watertight and dusttight for indoor or outdoor installation under all weather conditions.

U. L. and C. S. A. approved, the Killark plugs and receptacles are available in many styles and sizes to fit various boxes. The explosion-proof is made in 15 amp, 30 and 60 amp, and the weather-proof is made in 20, 30, 60 and 100 amp sizes.

For additional data, ask for item P-849, using the coupon on page 94.

Future additions anticipated with flexible fluorescent

THE FUTURLITER fluorescent fixture by the Edwin F. Guth Co., 2615 Washington Blvd., St. Louis 3, Mo., features the "flexible foot-candle

package," in anticipation of tomorrow's greater lighting needs with specially designed add-a-lamp—or a row—features.

This pleasing, functional luminaire is adaptable for 100 per cent downlighting, or combination up and down lighting. A complete range of units in four- or eight-foot lengths,

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Right now, many people in your area are planning new homes or remodeling.

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In this way, we KNOW WHO are really going to build—and turn these well-developed prospects over to Wesix dealers.

You can be a Wesix dealer

Wesix dealers also receive complete sales aids for completing these sales that Wesix develops.

And you can be a Wesix dealer.

Get in on the ground floor of the electric heating boom in your area. Start off with our Dealer Sales Kit that includes a complete catalog, window banners, truck decal, our Wiredheat Calculator, literature, and other selling tools tailor-made to help you to a larger share of the building dollar with Wesix Wiredheat!

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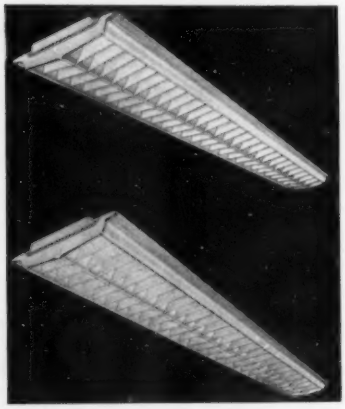
rapid start or slimline series are available.

Futurliters are available with Gratelite louver diffuser, metal cross baffles with either 35° x 25° or 35° x 45° lamp shielding, low brightness lenses, ribbed albalite and ribbed skytex glass bottoms.

For additional data, ask for item P-850, using the coupon on page 94.

Fluorescent fixtures for low ceilings

DESIGNED primarily for offices, schools and stores, the Parawing, Parawing Ultra, and Paralume, a beautiful new lighting series is being manufactured by Day-Brite Lighting,



Inc., 5411 Bulwer, St. Louis 7, Missouri. These fixtures can be described as "wing-like" in appearance with an apparent shallowness and accented width that blends the lighted fixture smoothly into the ceiling.

Translucent Polystyrene sides are extruded in one piece for either 4 or 8-foot units. In cross section the color-stabalized side pieces are a modified triangle, hollow inside, providing double diffusion of side light. Ends of extrusion have a Polyethylene cap to prevent entrance of dust and insects.

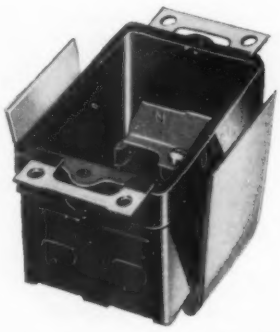
For additional data, ask for item P-851, using the coupon on page 94.

Permanently fixed ears featured on snap-in boxes

INSTALLATION time has been considerably reduced with the Old Work snap-in bracket and outlet boxes being manufactured by the Union Insulating Co., Parkersburg, West Virginia.

The 2¼ x 2⅛ x 3¾ inch snap-in box fits ¼ to one inch wall thickness and has 11.8 cubic inch wiring capacity. Ear screws are permanently fixed for perfect depth alignment, and are raised above top surface of box to insure snug fitting of wall plates.

Round boxes are designed for 4 inch hole saw mounting, and have a 16 inch wiring capacity. Maximum



distance across the permanently fixed ears is 4⅜ inches, thus bus is easily covered.

For additional data, ask for item P-852, using the coupon on page 94.

All home service entrance equipment in compact unit

A SERVICE ENTRANCE switch that combines all home service entrance equipment in its single compact cabinet has been introduced by American Electric Switch Division, The Clark Controller Co., 1146 East 152nd St., Cleveland, Ohio.

The switch features six branch pullouts in parallel for lighting and appliance loads and 24 plug fuse branches for lighting and heating circuits. Equal in capacity to a combination of two or more ordinary service entrance units, the switch reduces the contractor's material and labor costs. The six pullout service entrance switch has a 200 ampere rating, and is designed for 120-240 volt a-c application. Models are available for either surface or flush mounting.

For additional data, ask for item P-853, using the coupon on page 94.

Oven ventilator for gas or electric ranges

A VENTILATOR designed exclusively for use with built-in electric or gas ovens has been announced by Trade-Wind Motorfans, Inc., 7755 Paramount Blvd., Riviera, Calif.

This new unit is engineered with more than adequate capacity to remove the blast of oven heat, odors and greasy air each time the door is opened. It incorporates the famous Trade-Wind 300 CFM twin centrifugal blowers installed in the back part of the over-the-oven cabinet (leaving the front section available for storage) and a choice of two attractive hood styles in 24", 27" and 33" lengths for single oven units and a 45" length for double ovens. The hoods are available in antique copper, stainless steel and copper and match the Trade-Wind line of range ventilating hoods.

A snap-in, easy-to-clean filter is located under the hood. An inlet duct carries the hot, contaminated air from the hood to the ventilator which

SOUTHERN

SHAL-O-LITE LUMINAIRE

This shallow luminaire may be used as an individual unit, in continuous rows, or arranged in various patterns. When surface mounted, the plastic side panels of ribbed, polished diffusing polystyrene illuminate the adjacent ceiling. The white translucent louver of molded 5/8" cubicles provides 42-degree shielding lengthwise and crosswise.

Available in two, four, or six lamp luminaries with Rapid start, Slimline, or starter type ballasts.

Remember, specify and satisfy with SOUTHERN fluorescent fixtures.

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of heating elements

- **automatic thermostat**
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and many other deluxe features
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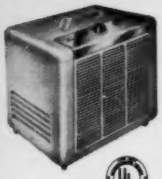

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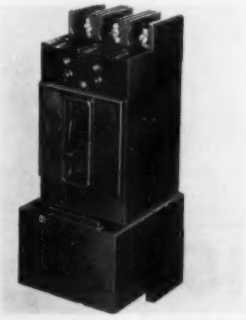
exhausts it to the outside. A built-in backdraft damper is standard equipment and interchangeable horizontal or vertical discharge is provided. The oven ventilator has an automatic thermostat control which automatically turns on the ventilator should the oven become over heated.

For additional data, ask for item P-854, using the coupon on page 94.

Tri-Pac circuit breakers have three tripping elements

NEW TRI-PAC circuit breakers available from Westinghouse Electric Corp., P. O. Box 2099, Pittsburgh 30, Pa., contain a modified AB breaker and a current limiting fuse with three tripping elements; time-delay thermal, instantaneous magnetic, and current-limiting fusible.

The new breaker eliminates any possibility of single-phasing on faults, and can be quickly reset after breaking on overload or usual fault current. Tripping cause, whether over-



load, usual fault or extreme fault, is indicated upon resetting of the breaker. Fuse testing is eliminated by the plungers in the special fuses that tell which phase or phases are in trouble.

The breakers are now available in three frames in NEMA standard ratings of 100, 225, and 400 amperes, two or three poles. Ratings 600 and 800 amperes are to follow. Interrupting capacity at 250 volts d-c and 800 amperes are to follow. Interrupting capacity at 250 volts d-c and 600 volts a-c is 100,000-rms amperes.

For additional data, ask for item P-855, using the coupon on page 94.

Bell reducer for mast type service is threaded internally

AN ALUMINUM bell reducer for Type K entrance cable is now being produced by the J. A. Weaver Co., 2110 Howard Street, St. Louis, Missouri. Both types are threaded internally on the large end for 2" pipe.

The No. BR-21 is threaded internally on the smaller end for 1" water tight connectors, and the No. BR-2114 is threaded internally on the small end for 1¼" water tight connector. Weaver bell reducers are cast of high strength aluminum alloy and

EVERY TOOL NEEDED
for the complete spinning job

CABLE PLASTIC RINGS
Designed especially for power cable.

LASHING WIRE CLAMPS
For holding [illegible] wire prior to terminating.

PLATFORM CLAMPS
[illegible] perfect tool for supporting splicer's platform.

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For raising material to the pole or messenger.

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Either ratchet handle or slip handle — for pulling slack in the messenger when splicing.

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Pirelli of Great Britain

Pole mounting equipment

(Continued from page 76)

Homes, Schools, Factories

are specifically designed for use on installing mast type services.

For additional data, ask for item P-856, using the coupon on page 94.

Versatile circuit breaker for lighting-distribution panels

A LOW-COST 3-pole, 50 ampere, 240 volt frame circuit breaker which permits major cost savings for combination lighting and distribution

panels has been announced by The Square D Co., 6060 Rivard St., Detriot 11, Mich.

This breaker extends the usefulness of QO circuit breaker panelboards and loadcenters for 3 phase, 3 and 4 wire, 240 volt AC circuits as well as single phase, 2 and 3 wire circuits. The sequence bus connections permit any adjacent single poles to be changed to double poles on any bus, as well as 3 poles on 3 phase bus arrangements. It is available from distributor's stocks in 15, 20, 30, 40 and 50 ampere, 240 volt ratings.

For additional data, ask for item P-857, using the coupon on page 94.

Slipknot brown splicing compound

SLIPKNOT brown splicing compound, a brand new rubber tape with characteristics exceeding ASTM electrical specifications, is now ready for shipment to wholesalers throughout the country, it was announced by Plymouth Rubber Company, Inc., Canton, Mass.

Plymouth Rubber, manufacturers of slipknot friction tape, spent several years of research and testing in developing a splicing compound with a natural brown rubber base. Slipknot brown friction tape, also made with natural brown smoked rubber, has been on the market for some time, with excellent acceptance in the trade.

The new brown splicing compound is packaged in 25 foot rolls, ¾" wide, with rolls cello-wrapped and boxed for individual sales. It is also available in shop dispenser cans of 10 rolls, each cello-wrapped.

For additional data, ask for item P-886, using the coupon on page 94.

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HANGING AND FASTENING DEVICES

BUY Paine provides one source for all of your hanging and fastening requirements at the right prices.

STOCK Paine attractive functional packaging provides for ease of handling, storage, and inventory.

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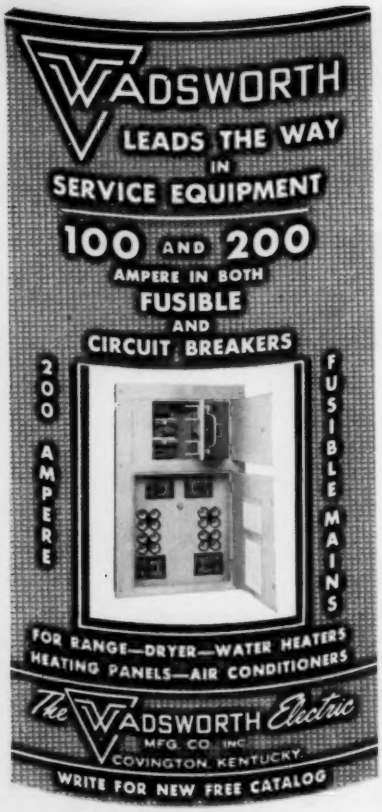
(August 1957)



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Use KING
RIGID-NOB
CABLE STAPLES

RIGID-NOB Design Provides Raised Driving Knobs — plus A Ridge Member To Assure Easy, Straight Installations

All sizes available in Bright Steel
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Write for free samples and price list

KING MFG. CO. INC., JAFFREY, N.H.

Pole mounting equipment

(Continued from page 76)

formers having sidewall primary bushings in the higher voltage range.

By combining the extended model units with the standard unit in the center position (lower photo), better pole loading is obtained due to the two outside units balancing each other while the center load is kept closer to the pole.

Independent laboratory tests show adequate strength for all distribution transformers equipped with mounting lugs plus a liberal safety factor in either the single band installation that mounts up to 3—25 kva using vertical adapter plates, the two band that mounts all transformers up to 3—100 kva without plates or 3—167 kva with horizontal plates based on latest EEI-NEMA standards.

For additional data, ask for item U-835, using the coupon on page 94.

Legal advice

(Continued from page 50)

to have remedial legislation passed anent the present interpretation of the Mechanic's Lien law. We have engaged a leading Tampa attorney to wage the battle. Local building tradesmen are allyin: themselves with our movement. Too many of them had been deluded into thinking that all they had to do to insure their money on a job was to file a mechanic's lien. Now they know how wrong such an assumption is.

Lightning arresters

(Continued from page 56)

magnet and, therefore, do not demagnetize it. Currents of 100,000 amperes have been measured in the gaps with no ill effects to the magnets.

The reliability of the new device lies in its utter simplicity. The new magnetic design is being used in all station and line type arresters.

EXPERIENCED SUPPLY PERSONNEL

ELECTRICAL DISTRIBUTOR WITH HOUSES IN KEY CITIES OF FLORIDA CAN USE SEVERAL TRAINED MEN. GROWTH AND EXPANSION HAS CREATED OPENINGS IN VARIOUS CATEGORIES. INSIDE SALES—TELEPHONE ORDER MEN—OPERATIONS—QUOTATIONS—ETC. IF YOU WOULD LIKE TO LIVE IN FLORIDA THIS IS A WONDERFUL OPPORTUNITY FOR EXPERIENCED PERSONNEL. IN REPLY GIVE FULL PARTICULARS, AGE, MARITAL STATUS, BACKGROUND OF EXPERIENCE AND SALARY. ALL REPLIES WILL BE HELD IN STRICT CONFIDENCE. Box 726, ELECTRICAL SOUTH, 806 Peachtree St., N.E. Atlanta 8, Georgia

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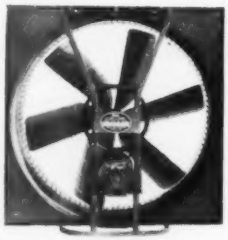
Is The Answer to Low-Cost Cooling



CQ Fan, one of many models from 1400 to 154,000 C.F.M.

May be installed in any position.

Whenever the call's for cooling, install COOLAIR. Costs you less —performs better—anywhere. For information and prices, write

Coolair

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...just a few stars in
ELLIOTT'S COMPLETE LINE OF FITTINGS

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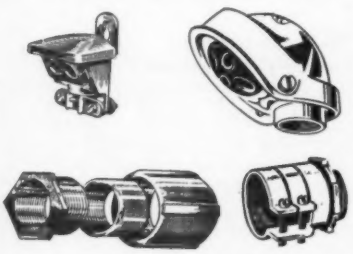

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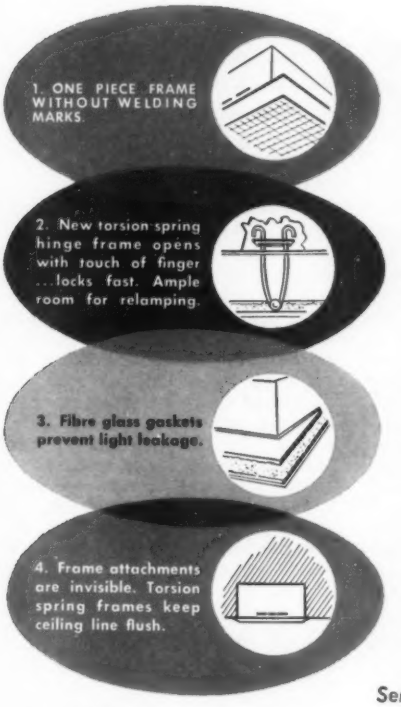
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2. New torsion spring hinge frame opens with touch of finger ...locks fast. Ample room for relamping.
3. Fibre glass gaskets prevent light leakage.
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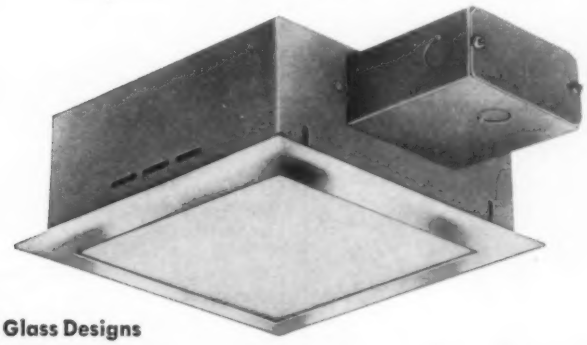
advanced recessed lighting by ATLITE

Superior lighting design and construction plus low cost make Atlite the value line in recessed fixtures.



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Satin Aluminum Anodized...Satin Black Anodized

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ANCHOR for 1/3 the COST

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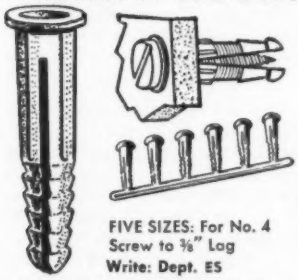

FIVE SIZES: For No. 4 Screw to ⅜" Lag
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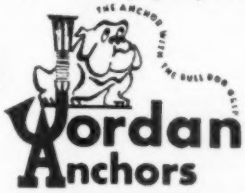

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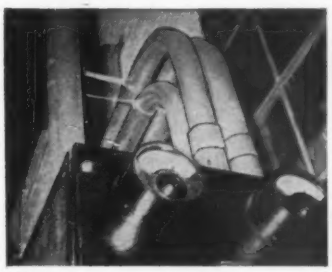
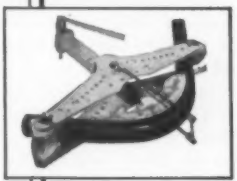


- 20 hours in time
- $64 in materials

SAVED ON ONE JOB WITH A TAL PORTABLE BENDER

by the Johnson Electric Co. Chicago

By making 12 90° bends in 3" conduit with a TAL ONE-SHOT BENDER instead of using elbows and couplings, time was cut from 59 to 39 hours... $134 was saved on labor and material on installation of a 250 hp, 220 volt, 3-phase air compressor in the shop of the Diamond T Motor Car Co., Chicago. This was possible only because a TAL ONE-SHOT completes bends in one setting—no shifting of pipe is necessary!



COMPLETE LINE OF BENDERS

- For pipe up to 8"
- For copper and thinwall tubing.
- 6-Way Hickeys — do what others can't do.

TAL BENDING EQUIPMENT, INC.
Milwaukee, Wisconsin
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welcome warmth

without dirty walls
when you install

Martin
Automatic
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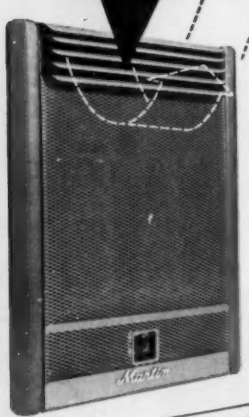
WALL HEATERS
with AIR-GUIDE
LOUVERS



• **Air-Guide Louvers** direct heat away from wall, decrease wall smudge . . . increase active heat thrown directly into the room instead of wasting it on walls.
• **Safety Mesh Grille** allows easy heat passage but excludes little fingers, prying objects. Detaches easily for cleaning.
• **Guaranteed** 10 years against burnout of heating element. *No service calls on Martin Heaters!* They're TROUBLE-FREE!
• **One Knob Thermostat and Switch.** Heavy duty model. Gives accurate temperature control. Ceramic chimneys circulate warm air efficiently.

Martin Automatic Electric Wall Heaters are designed for easy installation, keeping profit margins high. Trouble-free engineering means no call-backs for repair. Double-action heating radiates infra-red rays directly into room. Natural circulation gives quick, even heat. Write for descriptive folder.

Martin Stamping & Stove Co.
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Makers of Electric Automatic Baseboard Panels, Automatic Portable Heaters, Recessed Bath Heaters, Floor Furnaces, Ceiling Cable.

Free bulletins

available to our readers

A sixteen-page manual containing descriptive and pictorial information on **control centers** is available from the **Square D Co.,** 4041 North Richards St., Milwaukee 12, Wisconsin. Special attention is given to planning the control center and how to write the specifications.

For additional data, ask for item B-858, using the coupon on page 94.

A handy condensed **lighting catalog** including contractor-dealer net prices has just been issued by **Steber Manufacturing Co.,** Broadview, Illinois.

This new catalog includes the complete Steber line of sealed beam lamp components, floodlights ranging in capacity from 100 to 1500 watts, gymnasium lighting units, high bay lighting units, service station lighting equipment and reflectors. Available upon request to manufacturer.

For additional data, ask for item B-859, using the coupon on page 94.

A **hinged-cover wireway** with each length and fitting completely accessible for lay-in wiring, is the subject of a revised four-page, two-color bulletin issued by the Distribution Assemblies Department of the **General Electric Co.,** Plainville, Conn.

The publication describes in detail application, features and selection data on the new wireway, designated the Type HW. Also listed are catalog numbers, ratings, dimensions and guide form specifications. Available in even one-foot through five-foot lengths, the wireway is manufactured in 4" x 4", 6" x 6", and 8" x 8" sizes.

For additional data, ask for item B-860, using the coupon on page 94.

A **plug-in busway,** designed primarily to serve as feeders for lighting and power loads, is the subject of a revised 20-page bulletin issued by **General Electric's** Distribution Assemblies Department, Plainville, Conn.

Known as the Type FVK, the plug-in busway is suitable for 2- and 3-pole, 600-volt, 3-phase, 4-wire, 120/208Y-volt; and 3-phase, 4-wire, 480Y/277-volt applications in industrial, commercial and public buildings.

The revised bulletin describes in detail the functions, applications and features of Type FVK plug-in busway. It also lists ratings, weights, technical data, installation data and guide form specifications.

For additional data, ask for item B-861, using the coupon on page 94.

Catalog bulletin CR1W, describing the new 200-mva Kyle Type W **oil circuit recloser,** is now available from **Line Material Industries,** McGraw-Edison Co., Milwaukee 1, Wis.

This bulletin contains information about application, operating features, design features, ratings, and important modifications that can be achieved by use of accessories. Dimensions and ordering information are furnished.

Bulletin CR1W is liberally illustrated with graphs, charts, and tables, including time-current curves, duty cycle, interrupting and load ratings, and specifications.

For additional data, ask for item B-862, using the coupon on page 94.

Hope Electrical Products Co., 28 Long Avenue, Hillside, New Jersey, has just issued a new four-page bulletin describing and illustrating **enclosed current limiting air circuit breakers.**

These combine the design and operating features of circuit breakers and current limiting fuses in one compact unit to afford fault protection up to 100,000 rms amperes. The bulletin covers types, sizes and prices for these new units in capacities of 100, 225, 400 and 600 amperes, 600 v.

For additional data, ask for item B-863, using the coupon on page 94.

The use of standardized, modular trusses and small parts for the **fabrication of electrical transmission substations** is pictured and described in a new, colorful 8-page brochure published by **The Charles E. Schuler Engineering Co.,** Newark, Ohio.

By using a standard bill of materials, a transmission line or power station engineer can lay out and specify any size or type of substation structure from a rough perspective or similar drawing of the desired substation. Steel layout and detailing is completely eliminated from the design engineer's task. Engineering time on many projects is reduced from months to a few days.

For additional data, ask for item B-864, using the coupon on page 94.

Four new **lighting fixture catalogs** are available now from the **John C. Virden Co.,** 6103 Longfellow Ave., Cleveland 3, Ohio.

The residential catalog includes pull-down fixtures, a new line of traditional ceiling pieces with matching wall and ceiling brackets, new

outdoor brackets and post lanterns, a line of circlines in chromium or white finish, and perforated two tone bullets in a variety of color combinations.

The other three catalogs are devoted to commercial and industrial fluorescent fixtures which include Plexiglas diffuser units in surface and recessed type; slimline and fluorescent fixtures and strip, and slotted and direct type industrial fixtures.

For additional data, ask for item B-865, using the coupon on page 94.

A new 20-page illustrated 2-color catalog (Bulletin 6125) covering **packaged air conditioners** is now available from **American Blower Division of American-Standard,** Detroit 32, Mich.

Design features are detailed and illustrated, and such operating components as cooling coils, fan, fan motor, compressor, condenser and controls are thoroughly discussed. Complete physical data for the units and all major components are given.

For additional data, ask for item B-866, using the coupon on page 94.

How a low-cost **tool for connecting electric cable** can pay for itself on just one job is explained in a new publication of the **Burndy Corp.,** Norwalk, Conn.

It cites the case of a contractor using the MY29 Hytool to install compression-type connectors. He was able to complete a typical job with only $26 worth of compression connectors, instead of $123 for cast connectors. On this one job the tool saved several times its price in material cost alone.

For additional data, ask for item B-867, using the coupon on page 94.

A two-page data sheet is available from the **Superior Electric Co.,** 83 Laurel St., Bristol, Conn., describing their new portable Powerstat **variable transformer.** It is ideally suited for laboratory, inspection, classroom and other applications where current requirements do not exceed 1.0 amperes.

For additional data, ask for item B-868, using the coupon on page 94.

Features which contribute to the outdoor dependability of Type FOD **weather-protected motors** in ratings from 250 to 900 hp are described in a new bulletin released by **Allis-Chalmers Manufacturing Co.,** P. O. Box 512, Milwaukee, Wis.

Built to meet defined NEMA requirements, the motors feature a sturdy steel frame, a removable prewound stator assembly, proven in-

New Revere Fluoresign Outdoor Luminaire

Now—high level illumination for poster panels, walls

Better light distribution, simplified installation, and flexibility to fit any display are three good reasons for specifying Revere's Fluoresign Outdoor Luminaire.

Fixtures employ fluorescent rapid-start lamps which provide 10 times the rated life of incandescent types . . . plus greater operating economy for low temperature outdoor use. New reflector design minimizes trapped light, and provides uniform light distribution.

Lightweight aluminum reflectors of 4, 6 and 8 feet may be assembled with end and center housing fixtures to any desired display length. Reflectors rotate in any direction — within full 360° — by simple screwdriver adjustments.

Write for complete bulletin No. 300-21 describing Revere's Fluoresign Outdoor Luminaire.

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OUTDOOR LIGHTING: Industrial, Commercial, Service Stations, Streets, Sports, Airports, Shopping Centers

sulation, capsule-mounted split sleeve bearings, removable air ducts, and protective screens.

For additional data, ask for item B-869, using the coupon on page 94.

Twinduct **electrical surface raceway** manufactured by **National Electric Products Corp.,** Two Gateway Center, Pittsburgh, Pa., is reviewed in an illustrated, four-page bulletin published for architects, engineers, electrical contractors, home builders and other specifiers of electrical equipment.

Twinduct is described as a modern dual-service electrical distribution system comprised of two runs of metal duct under a single screw-type cover. It is produced with ½-inch and ¾-inch knock-outs and mounting holes located on 15-inch centers. With the common removable cover, runs are shown as easily accessible to accommodate lay-in wiring.

For additional data, ask for item B-870, using the coupon on page 94.

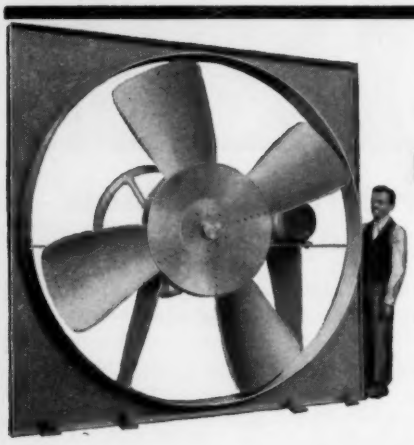
A new, 8-page illustrated booklet, which gives complete information about the new Type "IMP" (interchangeable multiple pole) and "FMP" (fixed multiple pole) **heavy duty relays,** has just been published by **The Arrow-Hart & Hegeman Electric Co.,** 103 Hawthorne St., Hartford, Conn. This booklet should be of interest to all those who sell, specify, install, maintain or use heavy duty relays.

Diagrams and dimensional drawings, as well as photographs, are used in this booklet to illustrate the extreme versatility of these new relays which make it possible to meet almost any relay requirement with a minimum stocking of replacement parts. Parts are standardized and interchangeable throughout the entire line.

For additional data, ask for item B-871, using the coupon on page 94.

Hubbard and Co., 6301 Butler St., Pittsburgh 1, Pa., has released a four-page information sheet describing their new **transformer mounts** which fit all poles from 6½ to 16 inches in diameter. These all-steel brackets will support one, two, or three transformers from 3 kva to 167 kva. "Hubmounts" will support a combined vertical load of 15,000 pounds with no visible deformation of any parts.

For additional data, ask for item B-872, using the coupon on page 94.



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"E" BLOWERS-EXHAUSTERS

A twelve page brochure showing the complete line of Trade-Wind kitchen and bathroom **ventilators, hoods and wall insert heaters** is now available free of charge from **Trade-Wind Motorfans, Inc.,** 7755 Paramount Blvd., Rivera, California. This bulletin gives unit sizes and shows installation data and accessories.

For additional data, ask for item B-873, using the coupon on page 94.

Bulletin SL-56, has recently been published by the **Hub Electric Co.,** 2255 West Grand Ave., Chicago 12, Ill. **"Engineered Lighting** and control Equipment **for the Modern School Stage"** is not a catalog, but a comprehensive presentation of an overall co-ordinated design.

A consulting engineer and outstanding authority in auditorium design and stage lighting presents a complete set of recommendations for the basic layout of lighting and control equipment for the modern stage.

For additional data, ask for item B-874, using the coupon on page 94.

A new booklet is available describing the modern, versatile **motor control centers** featuring easier installation, greater safety and reduced maintenance that are being produced by the **Nelson Electric Manufacturing Co.,** 4041 S. Sheridan Rd., Tulsa, Okla.

The class 1035 control centers combine a number of devices for motor control, circuit protection and motor protection in a single attractive unit. The Nelson design adapts readily to a wide variety of starters, circuit breakers, lighting panels, transformers, etc.

For additional data, ask for item B-875, using the coupon on page 94.

Seven new catalogs have been issued recently by the **Automatic Switch Co.,** Florham Park, New Jersey, describing their extensive line of **electromagnetic controls.** Ask for catalogs dealing with the company's complete lines of automatic transfer switches (mechanically or magnetically held), remote control switches, magnetically held contactors, relays, a-c and d-c solenoids, electric plant controls, or electromagnetic controls.

For additional data, ask for item B-876, using the coupon on page 94.

Released by **General Electric's** Instrument Department, Schenectady 5, N. Y., the 1957 buyer's guide of **instrument transformers** includes prices, ratings, ASA accuracy classifications, weights and dimensions, and catalog numbers on current and

potential transformers, both indoor and outdoor type; metering outfits; portable transformers, both current and potential; and Thyrite protectors.

Additional information is given on tests, mechanical and thermal limits of current transformers, previous types of transformers and their replacements. Photo-caption technique permits quick, easy reference to voltage ranges, nomenclatures, basic construction features, maximum and minimum primary voltage ratings, current ratings, ASA insulation classes, impulse levels, and cycles.

For additional data, ask for item B-877, using the coupon on page 94.

Smithcraft Lighting, 217 Everett Ave., Chelsea 50, Mass., has released a new 52-page price catalog on its complete line of commercial, industrial and recessed **fluorescent lighting equipment.**

The new price catalog provides information on Smithcraft's commercial fixtures, commercial stem sets and hangers, aluminum troffers and one- and two-foot wide troffers. Industrial fixtures, economy units, and parts and accessories are listed in the industrial section.

For additional data, ask for item B-878, using the coupon on page 94.

Folder form 3-1256 issued by the **Fullerton Manufacturing Corp.,** Box 110, Norwalk, Connecticut, illustrates the company's completely **luminous plastic enclosed fluorescent** fixture called the Quentin.

The folder shows lighting application and gives construction details. It is designed to serve a two-fold purpose — as a catalog insert and as a self-contained mailing piece for use locally by contractors and utilities for mailings to commercial lists.

For additional data, ask for item B-879, using the coupon on page 94.

An illustrated four-page brochure which details the construction and characteristics of their **Panelescent lamp** is being offered by **Sylvania Electric Products, Inc.,** 1100 Main St., Buffalo 9, N. Y. The lamp produces light by the principal of electroluminescence, the creation of light by the excitation of certain phosphors placed in an electric field. The brochure pictures a number of many new applications of the lamp which was first marketed by the company about three years ago.

For additional data, ask for item B-880, using the coupon on page 94.

The **Ansonia Wire & Cable Company** of 111 Martin St., Ashton, Rhode Island have announced the publication of a new and complete brochure on **supervisory and station control cables.** This new illustrated literature introduces the many applications for Ansonia supervisory and station control cables and gives complete technical information and engineering specifications on the cables offered by Ansonia.

For additional data, ask for item B-881, using the coupon on page 94.

Acme Electric Corp., Cuba, New York, has released a new catalog on **variable voltage adjusters** which emphasizes the importance of maintaining a constant voltage to obtain the maximum performance from electric powered or electric driven equipment. It also briefly covers the problem of voltage drop and voltage fluctuation as a result of overloads or distribution systems.

For additional data, ask for item B-882, using the coupon on page 94.

A new 28-page illustrated catalog describing the new line of HS **utility sets** is now available from **American Blower Division** of American-Standard, Detroit 32, Michigan.

Selection factors, such as space volume, quantity of fresh air required, altitude and temperature correction, outlet velocity, duct size, static pressure and tip speed are thoroughly discussed.

For additional data, ask for item B-883, using the coupon on page 94.

Of special interest to wire and cable buyers is a new brochure illustrating the uses of **aluminum in electrical systems,** and published by the **Reynolds Metals Co.,** 2500 South 3rd St., Louisville 1, Ky.

Titled "Reynolds Aluminum in the Electrical Industry," the 12-page brochure features detailed information on ACSR (aluminum cable steel reinforced) and covered aluminum conductor.

For additional data, ask for item B-884, using the coupon on page 94.

Two new bulletins are available from **Allis-Chalmers Manufacturing Co.,** Box 512, Milwaukee 1, Wis., entitled **"How to Make a Motor Go . . .** and Go, and Go, and Go," and "How to Take Step Seven."

For additional data, ask for item B-885, using the coupon on page 94.

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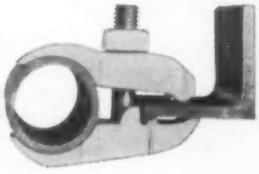

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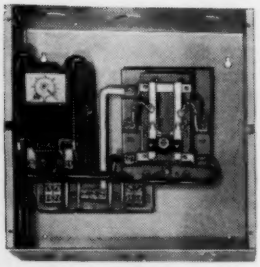

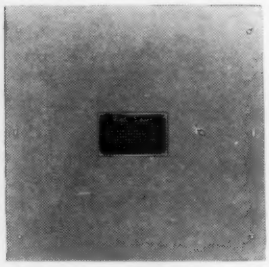

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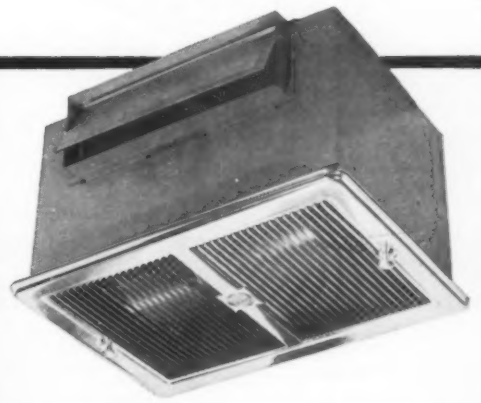

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Explosion

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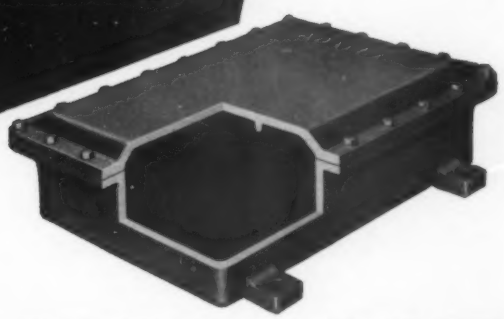

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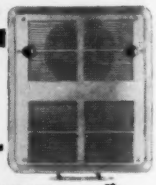

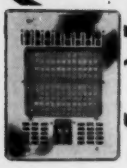

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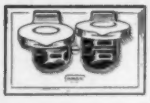

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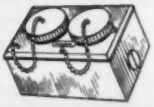

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